

DOCUMENT RESUME

ED 410 448

CE 074 639

TITLE Diagnostic Care: Grade 9. Technology Learning Activity. Teacher Edition. Level 2. Technology Education Series.

INSTITUTION Oklahoma State Dept. of Vocational and Technical Education, Stillwater. Curriculum and Instructional Materials Center.

PUB DATE 1997-00-00

NOTE 197p.; For related documents, see ED 383 934-935, ED 380 587-605, ED 391 073, and CE 074 640.

AVAILABLE FROM Curriculum and Instructional Materials Center, Oklahoma Dept. of Vocational and Technical Education, 1500 West Seventh Avenue, Stillwater, OK 74074 (order no. TLA TE-1208, \$70).

PUB TYPE Guides - Classroom - Teacher (052)

EDRS PRICE EDRS Price MF01 Plus Postage. PC Not Available from EDRS.

DESCRIPTORS Allied Health Occupations; Allied Health Occupations Education; Behavioral Objectives; *Career Exploration; *Clinical Diagnosis; Competency Based Education; Curriculum Guides; Grade 9; Health Personnel; Instructional Materials; Integrated Curriculum; Junior High Schools; *Learning Activities; *Medical Evaluation; Medical Services; *Physical Examinations; Pretests Posttests; State Curriculum Guides; Symptoms (Individual Disorders); Teaching Guides; *Technology Education

IDENTIFIERS Oklahoma

ABSTRACT

This Technology Learning Activity (TLA) on exploring diagnostic care careers for Grade 9 is designed for use in eight class periods. It gives students experience in using standard health care equipment to perform basic diagnostic procedures. This teacher's edition begins with an overview of technology education. The second section describes components of the instructor's section of the TLA: background information; priority academic student skills; suggested activities; suggested resources; instructional sequence; equipment, tools, and supplies summary worksheet; pretest and posttest; test answers; and evaluation summary. The third section describes components of the student's section: introduction; summary of activities; pretest instructions; assignments to turn in; goal; words you should know; priority academic student skills; objectives; related Technology Student Association event(s); academic and workplace applications; impact statements; career search; posttest instructions; and Skunk Works (optional activity). The fourth section identifies hazard alert messages. The actual instructor's and student's sections follow. Activities include the following: maintain and calibrate medical equipment; assess basic health signs; interpret cholesterol test results; calculate dietary intake of cholesterol and saturated fat; evaluate vision; evaluate hearing; research and report on diagnostic tests; obtain blood pressure reading; and career search. (YLB)

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ED 410 448

Technology Learning Activity



Technology Education Series

DIAGNOSTIC
CASE

TEA TE-1208

Level 2

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Teacher Edition

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Oklahoma Department of
Vocational and Technical Education
1500 West Seventh Avenue
Stillwater, OK 74074-1361

TE1208

TECHNOLOGY EDUCATION

TECHNOLOGY LEARNING ACTIVITY

TE1208

DIAGNOSTIC CARE: GRADE 9

Suggested Time: 8 Days



Developed by the
Curriculum and Instructional Materials Center
for the Technology Education Division
Oklahoma Department of Vocational and Technical Education

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Curriculum and Instructional Materials Center

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Printed in the United States of America by the
Oklahoma Department of Vocational and Technical Education
Stillwater, Oklahoma 74074-4364

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FOREWORD

What will be the careers of the future? The workforce of tomorrow will be shaped by the technologies being developed today. Students today need accurate, interesting information on growing technologies in order to make informed decisions about their futures.

It is our hope that this curriculum will help improve the quality of career decisions for our students. Students are introduced to a wide range of current, "cutting-edge" technologies and are encouraged to think critically about how those technologies influence their lives and futures. Today's students do not have to become the victims of "technological illiteracy," but instead can learn to anticipate technological developments and take positive steps to prepare for the future.

Technology Learning Activities provide students with the knowledge and an introduction to the skills they need for a positive learning and career experience. Every generation is faced with learning how to manage technological advances. Information gained through participation in the Technology Education program can help students develop a holistic view of technology on which to base their educational and career decisions.

Roy Peters, Jr., Ed.D., State Director
Oklahoma Department of
Vocational and Technical Education

Lynn Hawkins, State Supervisor
Technology Education
Oklahoma Department of
Vocational and Technical Education

PREFACE

We believe that one of the most effective ways to improve education is through the development and implementation of a sound instructional materials system. Technology Education instructional materials represent a new design for CIMC which recognizes the importance of graphic materials in the learning process.

Technology Education instructional materials are designed for 6th through 10th grade students. The design of these materials is based on current research on how people read and gain information from documents. The design is called "New Look" and integrates both graphics and text into a balanced presentation which is easy to use and follow.

Technology Education provides the student a look at what the world will be like in the future based on technologies in use and being developed today. Throughout the Technology Education instructional materials, the students are introduced to "cutting-edge" technologies that they will use and encounter in a working environment later in life. This exposure gives them a wide range of experiences on which to base career decisions.

This publication is intended as a starting point, from which the teacher can innovate, localize, and personalize in order to prepare students for their future. The Technology Education series of Technology Learning Activities was written with the realization that we are creating the workforce of tomorrow by how and what we teach about technology today.

Len Haymans, Instructional Development Specialist
Curriculum and Instructional Materials Center
Oklahoma Department of
Vocational and Technical Education

ACKNOWLEDGEMENTS

The Curriculum and Instructional Materials Center (CIMC) extends its appreciation to those individuals who played important roles in the development of Technology Learning Activity materials.

Thanks is also extended to Lynn Hawkins, formerly a Technology Education teacher and currently State Supervisor, and Jim Harder, a Technology Education teacher at Mayfield Junior High School, for the time, talent and knowledge they contributed in determining the content of this Technology Learning Activity (TLA).

Thank you is extended to the vocational educators who helped with field testing and contributed their expert input on individualized vocational instructional methods.

Trevor Fieldsend
Stillwater Junior High School

Annett Rust
Putnam City West High School

We also thank the State Director, Dr. Roy Peters, Jr., and the Assistant State Director, Dr. Charles O. Hopkins, for their continued support throughout this project.

The school administrators who supported instructor participation in this project and/or allowed their facilities to be used as field test sites in this project also deserve a special thank you.

Joe Payne
Stillwater Junior High School

Jerry Rickerts
Putnam City West High School

Oklahoma Department of Vocational and Technical Education Technology Education staff who provided leadership and direction on this project also deserve special recognition.

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Program Specialist
Technology Education

Also deserving special recognition is the Oklahoma Department of Vocational and Technical Education Health Occupations Education staff who provided technical guidance and assistance on this project.

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Health Occupations Education

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Health Occupations Education

Sandy Mittelsteadt
Program Specialist
Health Occupations Education

Sincerest thanks go to Art Gardner, for writing and formatting this document. His professionalism, dedication, and commitment to quality instructional materials allowed us to design and develop this technical learning activity so that students can readily use to explore new and exciting health occupation technologies.

Only through the close cooperation of the Curriculum and Instructional Materials Center (CIMC) staff was this curriculum developed. Sincere thanks are shared with the CIMC coordinators.

John Friedemann
CIMC Team Leader

Lynna Ausburn, Ph.D.
CIMC Development Coordinator

Special recognition and thanks are also extended to other individuals with the Oklahoma Department of Vocational and Technical Education (ODVTE) involved in the development and distribution process; Bob Davis and staff art Kathryn Moore for the cover design; Darrell Stiles and his staff in the ODVTE Warehouse for packaging and coordinating transportation and distribution of this material.

Finally, a big thanks you to all ODVTE team members who offer their support on a daily basis in behind-the-scenes ways but never seem to be recognized for their contributions: Suzanne Perry and Terri Tomson, CIMC secretaries; Clara Orr and Beverly Mealer, Technology Education secretaries.

Len Haymans
CIMC Instructional Development Specialist

TECHNOLOGY EDUCATION OVERVIEW

About the Program

Because the American culture is distinctly characterized as technological, it becomes the function of our schools to give every student an insight into and an understanding of the technological nature of the culture. Technology Education strives to perform this function.

Technology Education in Oklahoma is an instructional program that provides young men and women (grades 6-10) with daily, hands-on exploratory experiences and insights into technology and career opportunities so that they can make meaningful occupational and educational choices. It is a program which can enhance the educational experience of all students, whether they are the valedictorian/honor-type student, the middle range/average student, or the student who has found little success in school, namely the at-risk student.

Technology Education acquaints all students with their technological environment so they can make rational decisions about their own lives on a day-to-day basis and participate in controlling their own destiny. The program directs students to related technological and industrial fields, enabling students to realize their full potential and make maximum use of their individual talents in fulfilling career goals in their selected areas of employment.

Technology education capitalizes on the individual's potential for reasoning and problem solving, for imagining and creating, and for constructing and expressing through the use of tools and materials related to technology. It develops content and experiences to contribute to the growth and development of students commensurate with their potential. Thus, Technology Education is a basic and fundamental study for all persons in regard to career explorations and educational opportunities.

TECHNOLOGY EDUCATION OVERVIEW

Opportunities to develop and apply leadership, social, civic, and technologically related skills are provided through the Technology Student Association (TSA). TSA is the appropriate vocational student organization identified as a teaching tool for teachers to use in assisting students to achieve identified course competencies. Competency-based activities are an integral part of the instructional program.

All Technology Education courses are taught in a one-period block of time (45-55 minutes), with each of the four Technology systems (communication, construction, manufacturing, and transportation, energy and power) being designed to provide a means through which other courses such as math, science, English, and social studies can be applied in a practical manner within a technology-based situation. Teaching across the curriculum is vital to the success of a Technology Education program.

TECHNOLOGY EDUCATION OVERVIEW

About the TLA

The Technology Education series consists of 40 Technology Learning Activities (TLAs) for instruction and a supplemental activities book. Each TLA is divided into two parts: an instructor's guide and a student guide. The instructor's guide provides an overview of Technology Education, a summary of activities and supplies needed for students to complete the Technology Learning Activity, a supplies and materials worksheet for the instructor, an overview of the particular TLA, written exam answer sheets, and evaluation summary for the TLA.

Master copies of the evaluation summary sheets, pretest and posttest, and supplies and materials worksheets are provided with this instructors edition of the TLA. These sheets may be reproduced for classroom use.

All of the TLAs focus on measurable and observable learning outcomes. Instructors are encouraged to supplement, personalize, localize, and motivate with these materials in order to develop a complete teaching/learning process.

TLAs are designed for use in more than one class period of instruction. Careful study of each TLA by the instructor will help her or him determine the following:

- >>> Skills to demonstrate
- >>> Supplies and equipment needed
- >>> Amount of time needed for student practice
- >>> Workstation Bookshelf, Instructors Reference Materials, and a bibliography are provided for supplemental resources
- >>> Supplementary materials, including print and non-print media to order
- >>> Resource people to contact

TECHNOLOGY EDUCATION OVERVIEW

- >>> Facility modifications which may be necessary to administer the TLA

Each TLA is based on performance objectives. Performance objectives are specific, stating the performances necessary to meet the goal of the TLA.

The overall goal of the unit tells what the student should be able to do and what standard will be used to determine whether the student has achieved competency. The specific objectives outline the sequence of the competencies required to meet the TLA goal. The competencies may be either cognitive, requiring knowledge only, or psychomotor, requiring knowledge and skill.

TECHNOLOGY EDUCATION OVERVIEW

About Ordering TLAs

Additional TLAs in the Technology Education series may be ordered through the Oklahoma State Department of Vocational and Technical Education, Curriculum and Instructional Materials Center, 1500 West Seventh Avenue, Stillwater, OK 74074-4364. Phone 1-800-522-5810.

NOTE: Instructor's Editions have order numbers in the 1100 series (for 8-Day TLAs) and 1200 series (for 6-Week TLAs). Student Editions have numbers in the 3100 series (for 8-Day TLAs) or 3200 series (for 6-Week TLAs).

Corrections and Suggestions

CIMC wants to provide Technology Education instructors and students materials that are accurate and effective. Although the CIMC strives to maintain the highest standards of development and production, oversights occasionally do occur. If you find any errors in this or other CIMC publications or have suggestions for improving their usefulness, please notify the CIMC staff. One easy way of pointing out errors is to make a photocopy of the affected page and indicate the correction on the copy. Mail this information to the CIMC, where it will be used to correct the publication before the materials are reprinted.

To ensure that the material is updated on a timely basis, notify the CIMC of necessary corrections as soon as possible. Do not assume that someone else will notice the error and inform the CIMC; other users may be making the same assumption. Please send corrections and recommendations for improving this publication to the following address:

Curriculum Development Coordinator
Curriculum and Instructional Materials Center
Oklahoma Department of Vocational and
Technical Education
1500 West Seventh Avenue
Stillwater, Oklahoma 74074-4364

USING THIS PUBLICATION

Background Information

Priority Academic Student Skills

INSTRUCTOR'S SECTION

The background information component provides instructors with basic information about the subject of the TLA. Instructors are encouraged to use suggested resources for additional information on the specific technology used in each TLA.

There are 14 Priority Academic Student Skills for the Technology Education series. Not every TLA fulfills all 14 Priority Academic Student Skills, so outcomes specific to each TLA are listed in the Instructors Section and in the Students Section. The 14 Priority Academic Student Skills for the Technology Education series are:

- The student will know and appreciate the importance of technology and technological literacy.
- The student will explore career opportunities so they can make meaningful occupational choices.
- The student will explore future educational opportunities so they can make meaningful educational choices.
- The student will apply problem solving and critical thinking techniques.
- The student will apply math, science, reading, and other school subjects in a practical situation.
- The student will develop keyboarding and computer literacy skills.
- The student will develop basic skills in the safe and proper use of tools, machines, materials, processes, and technical concepts.
- The student will think logically and sequentially.
- The student will develop leadership, creative abilities, positive self-concepts, and

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INSTRUCTOR'S SECTION

individual potential in a technological society.

- The student will develop an understanding and the ability to adapt to those technological forces that influence life in the 21st Century.
- The student will develop an understanding of economic development.
- The student will communicate by making clear and relevant points through the development of mental process skills.
- The student will apply design, imagination, and creative abilities.
- The student will explore the organization and management systems of business and industry.

Suggested Activities

The suggested activities component is designed to assist during the preparation stage of the teaching/learning process. The activities provide suggestions for preparation and evaluation during the instructional process. The instructor should read the suggested activities before assigning the TLAs to allow time to obtain supplemental materials, prepare audiovisual materials, and contact outside resource persons. Duties of the instructor will vary according to the particular TLA.

Suggested Resources

Suggested resources, include people, as well as print and non-print media that may be used with the TLA. References used during the development of each TLA are also provided. The instructor can use suggested resources and TLA references to supplement her or his knowledge of the subject to help students with particular interests or objectives in the area covered. Please note that suggested resources and references listed in this publication existed when this publication was written. CIMC

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INSTRUCTOR'S SECTION

Instructional Sequence

assumes no responsibility for providing these materials and cannot ensure the availability of these materials as individual vendors, manufacturers, and publishers may discontinue these products at any time.

This component provides instructors with daily lesson plans for the TLA. Included in the instructional sequence component are suggested daily assignments and equipment, tools, and supplies that will be needed for each student. A column for facility requirements or modifications is provided for each instructor. This component is provided as a guide to plan for and monitor students' progress through the TLA.

Equipment, Tools, and Supplies: Summary Worksheet

This component is provided as a planning tool for instructors. It provides instructors with a list of the necessary equipment, tools and supplies to support student activities and provides specific information for budgeting purposes.

Pretest and Posttest

These components provide criterion-referenced evaluation of the objectives listed in each TLA. If objectives or activities have been added, deleted, or modified, appropriate changes should be made on the tests.

Test Answers

This component is provided to assist instructors in evaluating student performance on written tests.

Evaluation Summary

This component is provided to assist instructors in summarizing the performance of each student on an individual basis. The evaluation summary forms are also provided as photocopy masters for the instructors use.

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Introduction

Summary of Activities

Pretest Instructions

Assignments to Turn In

Goal

STUDENT'S SECTION

Daily activities are the step-by-step procedures students will follow to complete the learning experience. Each TLA is organized by daily tasks and activities. Students are able to pace their progress through the TLA by referring to the activities for the day.

Within the daily activity pages are components common to all TLAs.

A Summary of Activities page begins each day of the TLA. This page provides several important pieces of information for both the student and instructor.

- 1** In the left column this page provides the student with a list of activities to be accomplished that day.
- 2** In the right column the major Academic and Workplace Application which applies to that day's activities is graphically indicated with a standard icon.
- 3** Below the icon is a list of specific skills reinforced during that day's activities.

The students are required to take a Pretest as one of the first day's activities. The instructions for the Pretest are given in this section.

Day One includes a list of all assignments the students are expected to turn in during or at completion of the TLA. This list includes all tests, activities, and products covered in the TLA.

On Day One, following the assignments checklist, is a concise statement of the overall goal of the TLA. This statement summarizes the purpose for completing the TLA and encourages the student to think about the broader implications of the learning experience.

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Words You Should Know

Priority Academic Student Skills Reinforced by this TLA

Objectives

Related TSA Competitive Event(s)

STUDENT'S SECTION

The first day's activities includes a glossary of unfamiliar technical terms used in the TLA. Often these terms are necessary for the student in order to accurately follow instructions in the activity procedures. The students should be encouraged to review this glossary and refer to it often during the course of the TLA.

As stated in the guide to the Instructor's Section, there are 14 identified Priority Academic Student Skills associated with the Technology Education series. This section of Day One activities lists the Priority Academic Student Skills that specifically apply to the TLA. A student who reviews this list will gain a better understanding of the scope of experiences and skills to be gained from the TLA.

Each TLA is made up of a set of measurable objectives. In this section on Day One, students are given a list of all the objectives addressed in the TLA. This list can serve to introduce students to the flow of the TLA as they build introductory skills in a technology.

Each TLA may be used by students to begin work toward completion of a Technology Student Association competitive event. Some TLAs are tied to a specific TSA event; other TLAs may be used with several events. This Day One section gives the student and instructor a list of appropriate TSA events which the TLA may support.

TSA competitive events promote leadership development, and an understanding that winning isn't everything but involvement is. Events are staged at Local, Regional, State, and National levels.

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Academic and Workplace Applications

Preparing students to enter successfully into today's world . . .

. . . emergence of a renewed emphasis on basic academic skills . . .

. . . expected learner outcomes are being implemented with increasing frequency.

STUDENT'S SECTION

The curricular content and activities found in this Technology Learning Activity help students apply academic and workplace competencies. These competencies include: Reading Skills, Writing Skills, Mathematics Skills, Science Skills, Oral Communications Skills, Interpersonal or Relating Skills, Creative Thinking and Problem Solving Skills, Employability Skills, and Social Studies Skills.

Preparing students to enter successfully into today's world of work offers vocational education a substantial challenge. The contemporary workplace is characterized by constant and rapid technological change and by increasing job complexity and skill intensity. Due to rapid technological advancement, the half-life of work skills is now reduced to a bare three to five years. Out of this new workplace environment has arisen a growing national awareness of the critical importance of an American workforce armed with the skills necessary to survive in a competitive economy.

One result of this national awareness has been the emergence of a renewed emphasis on basic academic skills in all areas of education. Pressure to increase academic skill development is being placed on education by both legislative action and industry mandate. The Carl D. Perkins Vocational and Applied Technology Education Act of 1990 sets stringent academic and workplace skill requirements for vocational education. State legislatures are increasingly requiring basic skills accountability by teachers and school administrators.

Graduation exams, minimum competency requirements, and expected learner outcomes are being implemented with increasing frequency. In addition, business and industry are delivering the message clearly to educators

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The issue of basic skills . . . was successfully addressed in a national three-year study . . .

. . . research indicates clearly that American employers . . . need a variety of skills . . .

. . . business and industry have expanded and redefined "workplace basics."

STUDENT'S SECTION

that vocational competence now requires increased strength in academic and workplace skills.

The issue of the basic skills currently required in the work place was very successfully addressed in a national three-year study conducted jointly by the American Society of Training and Development (ASTD) and the U.S. Department of Labor (DOL). The findings of this study were published in 1990 in the book, *Workplace Basics: The Essential Skills Employers Want*.

The ASTD/DOL research indicates clearly that American employers have discovered that their workforces need a variety of skills that include, but are not limited to, the classic academic trio of reading, writing, and computation. Employers now are also looking for competence in areas such as "learning to learn," problem solving and critical thinking, interpersonal and teamwork skills, oral communication and listening techniques, and the social and personal management skills that demonstrate a capacity for independence and responsibility in on-the-job performance.

It is clear that the requirements of today's business and industry have expanded and re-defined "workplace basics." It is in line with this re-definition, and with the competency requirements of current education legislation, that the Oklahoma Department of Vocational and Technical Education has chosen to address "basic skills" in the instructional materials produced by its Curriculum and Instructional Materials Center.

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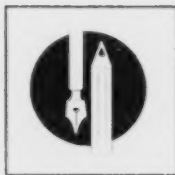
CIMC materials contain information and activities which develop academic and workplace application competencies . . .

To assist teachers and students in identifying activities which promote academic and workplace skills . . .



obtaining and applying information.

READING SKILLS: Skills involving use of print resource material for



information, or ideas.

WRITING SKILLS: Skills involving written communication of processes,

STUDENT'S SECTION

It is not a new development for CIMC materials to contain information and activities which develop academic and workplace application competencies in students undertaking vocational programs. What is new is the specific marking, or flagging, of items in our instructional materials that address academic and workplace application skills.

To assist teachers and students in identifying activities which promote academic and workplace skills development, CIMC has implemented a marking system which uses simple graphic symbols, or icons. These icons are located in the right margins of Activity Sheets. The following is an explanation of the icons and the kinds of academic and workplace application activities they indicate.

Current vocational education literature indicates that functional literacy as a workplace basic needs to be defined in terms of reading competencies actually required for job performance. The activities identified with this icon as addressing reading skills in CIMC materials deal specifically with developing reading skills in an applied, job-related context. These range from general information-gathering activities to tasks requiring use of specific technical reference materials. Many contain a "learning to learn" aspect, which promotes engaging actively and purposefully in vocationally relevant enquiry.

Tasks identified with this icon promote development of skills in written communications. As with reading skills, the writing skills emphasized in CIMC materials have a vocational context. They include filling out forms, keeping work activity records, writing simple memos and letters, generating more complex reports and articles, and written

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MATHEMATICS SKILLS:

Skills involving computation, calculation, and

interpretation of numerical



SCIENCE SKILLS: Skills involving mastery and application of scientific

information or theory.



ORAL COMMUNICATION SKILLS:

Skills involving speaking and

listening



INTERPERSONAL OR RELATING SKILLS:

Skills involving working and

getting along with others.

STUDENT'S SECTION

expression of ideas and concepts related to vocational performance or exploration.

This icon identifies activities which develop vocationally-related skills in computation, measurement and estimation, selection and application of appropriate mathematical processes, and collecting, displaying, or interpreting data.

This icon marks activities which are related to the development of skills in either the physical or biological sciences. These skills stress occupationally-related applications of science and technology.

Activities marked with this icon promote development of effective speaking and listening. They include practice in such areas as speaking techniques, word choice, non-verbal messages, use of communication media, and using active listening techniques. Many of these activities promote "learning to learn" skills in verbal enquiry.

Activities which deal directly with skills in relating to others are marked with this icon. This includes areas such as multi-cultural awareness, group processes and dynamics, negotiation, dealing with conflict, cooperation and teamwork, values and attitudes, and leadership and motivation.

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CREATIVE THINKING AND PROBLEM SOLVING SKILLS:

Skills involving comprehending, applying, analyzing, and developing complex ideas and situations.



EMPLOYABILITY SKILLS:

Skills involving choosing, obtaining, and succeeding in a career.



SOCIAL STUDIES SKILLS:

Skills involving investigation and application of social

STUDENT'S SECTION

This icon identifies activities which stress development of higher-order thought processes such as problem identification and analysis, lateral thinking, evaluating alternatives, developing solutions, examining assumptions, and evaluating outcomes.

Activities marked with this icon relate to competencies required to obtain employment and develop a career. These competencies include specific occupational tasks. They also include items such as career analysis and selection, job searching, completing applications and resumes, interviewing, and business etiquette and personal management skills required for job-keeping and maturing in one's work. Examples include personal presentation, self-discipline, work accuracy, reliability, discretion, punctuality, stress handling, judgement, confidence, etc.

This icon marks activities which stress competencies in fields relating to human society and its distribution and relationships. This includes areas such as history, geography, government and politics, economics, psychology, sociology, demographics, current events, cross-cultural studies, consumer issues, environmental issues, and ethical concerns in science and technology.

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Impact Statements

STUDENT'S SECTION

There are five areas of human culture for which each TLA has an impact. These impact statements appear during Day Eight, after the student has gained some familiarity with the technology.

- 1 ENVIRONMENTAL IMPACT: A statement introducing the student to the impact of the technology on the environment.
- 2 SOCIAL/CULTURAL IMPACT: A statement concerning the impact of the technology on society and culture.
- 3 ECONOMIC IMPACT: A statement concerning the impact of the technology on the economy.
- 4 POLITICAL IMPACT: A statement concerning the impact of the technology on politics, laws, and regulations, and the impact of politics on the development of the technology.
- 5 ERGONOMIC IMPACT: A statement concerning the ergonomic implications of the technology. Ergonomics is the study of developing products and systems that meet peoples' needs.

Impact Statements offer the student the opportunity to see beyond the activities in the Technology Learning Lab and glimpse the real-world applications of the technology.

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Career Search

Posttest Instructions

Skunk Works

STUDENT'S SECTION

Also on Day Eight, the students are given the assignment of investigating several career opportunities related to the technology of the TLA. The investigation is done with Career Search Abstracts. A list of up to five careers related to the TLA is given, followed by pages from Career Search Abstracts that detail the career qualifications and work environment. The student is required to choose two of the five related careers, read the appropriate abstracts, then write a short essay about why those careers may be appealing.

The students are required to take a Posttest as one of the last day's activities. The instructions for the Posttest are given in this section. The score for the Posttest may be compared to the score for the Pretest to help determine the student's gain during the TLA.

Skunk Works, a Day Eight optional activity, includes instructions that could be used for solving problems or reinforcing the enrichment of learning. The term Skunk Works was coined by engineers at 3M Corporation in the mid-1960s. Some engineers wanted to develop a new product, but company management would not give them the time or money to work on the project. So the engineers "borrowed" time and money from approved projects to work on their "Skunk Works." When they finished developing the product, they presented it to management and it has been a 3M product ever since. The product: Velcro fasteners.

HAZARD ALERT MESSAGES

The Daily Activities include hazard alert information specific to the Activity. These messages should be discussed carefully and thoroughly. The Hazard Alert Message system used in the TLA is based on the American National Standards Institute (ANSI) Standard Z535, which provides for five levels of alert.

Students are introduced to the ANSI Hazard Alert Message system as an activity in the Laboratory Safety for Construction Technology TLA (TE1107/TE3107). This system was adopted by ANSI as the standard in 1990 and will be the hazard alert system in use when students reach the workplace.



Hazard Alert Messages in the TLA are indicated both by the color red and graphically. There are three types of hazard alert graphics used in the TLA: the hazard alert symbol, injury hazard graphics, and avoidance graphics.

This Hazard Alert Symbol is used with the words **DANGER**, **WARNING**, and **CAUTION**. ANSI defines these words as:

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.

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HAZARD ALERT MESSAGES



There are two types of graphics used in conjunction with the hazard alert symbol. This type of graphic depicts a specific injury that may be expected if the hazard described in the alert is not avoided.

This second type of graphic is called an avoidance graphic. It depicts an action the student should take in order to avoid injury.

There are two other ANSI words used in the TLAs and the students should understand their meanings:

NOTICE indicates an action that could result in damage to property or equipment.

IMPORTANT indicates an instruction that can help the student do a better job.

TECHNOLOGY EDUCATION

Diagnostic Care: Grade 9

TE 1208/3208

INSTRUCTOR'S SECTION



BACKGROUND INFORMATION

Diagnostic care is at the core of health care. Diagnostic procedures help health care providers determine what is wrong with a patient. And the results of these procedures also help set the agenda for treatment.

Students interested in a career in health care are well served by taking this course. They will use standard health care equipment to perform basic diagnostic procedures. By giving them this experience early on in their education, we hope to fuel their interest in this important field.

INSTRUCTOR'S SECTION

PRIORITY ACADEMIC STUDENT SKILLS

- The student will know and appreciate the importance of technology and technological literacy.
- The student will explore career opportunities so they can make meaningful occupational choices.
- The student will explore future educational opportunities so they can make meaningful educational choices.
- The student will apply problem solving and critical thinking techniques.
- The student will apply math, science, reading, and other school subjects in a practical situation.
- The student will develop keyboarding and computer literacy skills.
- The student will develop basic skills in the safe and proper use of tools, machines, materials, processes, and technical concepts.
- The student will think logically and sequentially.
- The student will develop leadership, creative abilities, positive self-concepts, and individual potential in a technological society.
- The student will develop an understanding and the ability to adapt to those technological forces that influence life in the 21st Century.

INSTRUCTOR'S SECTION

SUGGESTED ACTIVITIES

- Obtain materials to supplement TLA. See Suggested Resources for video materials to supplement this module.
- Review instructional outline for this TLA. Modify time frames to suit class needs and plan activities for each class period.
- Study the specific objectives to determine those you will cover. Also decide which objectives should be taught to which students.
- Determine the scope and sequence of any objectives you add to the TLA. Design and develop support materials, including evaluation techniques, for these objectives.
- Determine how you will schedule time for students to demonstrate competence in the required procedures.
- Make arrangements for guest speakers. Supply speakers with specific objectives and other appropriate sections of this TLA.
- If you have access to the internet, search for and bookmark sites dealing with health care. You may want to try www.healthfinder.gov for information on health care. Also practice using search engines such as Yahoo and Alta Vista to find sites to suggest. And have the students, as they finish their activities, search for sites that discuss health care.

For more information on how to use this curriculum, visit the CIMC site on the web. It is located at:

www.okvotech.org/cimc/home.htm

INSTRUCTOR'S SECTION

PREPARATION

SUGGESTED RESOURCES

This TLA requires that you make available to students three medical references:

- A guide to diagnostic tests
- A dictionary of medical terminology
- An illustrated guide to anatomy

Due to the nature of medical books, great care must be taken on your part to ensure that the pictures and illustrations in these materials do not violate the community standards in your school district.

Video Tapes

You may wish to have these tapes available to students that have difficulty following the procedures in this TLA. They are available through:

Curriculum & Instructional Materials Center
1500 West Seventh Avenue
Stillwater, Oklahoma 74074-4502
1-800-654-4502

- *Vital Signs: Apical, Radial and Peripheral Pulse.*
- *Vital Signs: Blood Pressure*
- *Evaluating Vision*

INSTRUCTOR'S SECTION

WORKSTATION BOOKSHELF

INSTRUCTOR'S REFERENCE MATERIAL

LESSON PLAN

INSTRUCTOR'S SECTION

Instructional Sequence	Technology Education: Diagnostic Care		
	Assignments	Equipment, Tools, and Supplies	Facilities Requirements/ Modifications
Day 1	Take Pretest. Read and study the Assignment Checklist, Words You Should Know, Priority Academic Student Skills, TSA Competitive Events, and Academic and Workplace Skills.	Computer Score Sheet/card or notebook paper for Pretest	
Day 2	Complete Objective 1: Maintain and calibrate medical equipment.	Sphygmomanometer, stethoscope, tuning fork, Snellen eye chart, alcohol swabs, a photocopy of checklist for Objective 1	
Day 3	Complete Objective 2: Assess basic health signs (temperature, weight, height, pulse).	Stethoscope, oral thermometer, tympanic thermometer, scale, measuring tape or yardstick, alcohol swabs, watch with second hand, pen and paper, a photocopy of checklist for Objective 2. (Note: School nurse may have scale and tympanic thermometer available.)	
Day 4	Complete Objective 3: Interpret cholesterol test results. Complete Objective 4: Calculate dietary intake of cholesterol and saturated fat.	Calculator, a copy of the checklists for Objectives 3 and 4.	
Day 5	Complete Objective 5: Evaluate vision. Complete Objective 6: Evaluate hearing.	Newspaper or magazine, Snellen eye chart, a card or similar item that can be used to cover an eye, measuring tape or yardstick, ticking watch, tuning fork, a photocopy of the checklists for Objectives 5 and 6.	

LESSON PLAN

INSTRUCTOR'S SECTION

Instructional Sequence	Technology Education: Career Search		
	Assignments	Equipment, Tools, and Supplies	Facilities Requirements/ Modifications
Day 6	Complete Objective 7: Use professional reference materials to research and report on diagnostic tests.	Reference book on diagnostic procedures, dictionary of medical terms, illustrated guide to anatomy, pen and paper	
Day 7	Complete Objective 8: Obtain blood pressure reading.	Sphygmomanometer, stethoscope, alcohol swabs, a photocopy of the checklist for Objective 8	
Day 8	Read and study Impact statements Complete Career Search Activity Complete and unfinished assignments Complete posttest Complete Skunk Work activities	Computer Score Sheet/care or notebook paper for Posttest and Spelling Test Paper and pencil	

SUMMARY WORKSHEET

INSTRUCTOR'S SECTION

Equipment, Tools, and Supplies: Summary Worksheet

Equipment, Tools, and Supplies	Per Student	Per Period	Total Needed	Special Considerations	Cost Per Student	Cost Per Period	Total Needed	Special Considerations
Computer Score Sheet/card or notebook paper	1							
Paper and pencil	several sheets							
Alcohol swabs	several							
Sphygmomanometer		1						
Stethoscope		1						
Tuning fork		1						
Snellen eye chart		1						
Photocopies of checklists for Objectives 1-6, and 8.	1	1						
Calculator		1						
Watch with second hand		1						
Newspaper or magazine		1						
Card used to cover eye		1						
Measuring tape/yardstick		1						
Scale		1						
Oral and tympanic thermometer		1 each						
References for Workstation Bookshelf (see page 39)		1 set						
Note: School nurse may have scale and tympanic thermometer available.								

INSTRUCTOR'S SECTION

PRETEST

1. Diagnose means:
 - a. to cure
 - b. to identify
 - c. to treat
 - d. to heal

2. Auscultation involves:
 - a. looking
 - b. feeling/touching
 - c. listening
 - d. tapping

3. Symptoms that the health care professional can see, feel, hear, smell, or measure are called:
 - a. objective symptoms
 - b. subjective symptoms

4. A sphygmomanometer is used to:
 - a. examine inside the ear
 - b. test vision
 - c. measure blood pressure
 - d. test reflexes

5. Normal body temperature is:
 - a. 96.8°C
 - b. 96.8°F
 - c. 98.6°C
 - d. 98.6°F

PRETEST

INSTRUCTOR'S SECTION

6. Which of the following is *not* a major assessment factor when taking a person's pulse:
 - a. rate
 - b. location
 - c. rhythm
 - d. volume

7. Arrhythmia is a medical term meaning a person's pulse:
 - a. is weak
 - b. is too fast
 - c. has an irregular pattern
 - d. is too slow

8. The apical pulse is usually:
 - a. measured with a stethoscope
 - b. taken next to the heart
 - c. is measured when seated
 - d. all of the above

9. A cholesterol level of 200 - 239 mg/dl is considered:
 - a. too low
 - b. good
 - c. borderline
 - d. too high

PRETEST

INSTRUCTOR'S SECTION

10. The American Heart Association recommends that what percentage of your total daily calories should come from saturated fat?
 - a. 5%
 - b. 10%
 - c. 15%
 - d. 20%

11. Every time you reduce your overall cholesterol level by one percent, you reduce your risk of a heart attack by:
 - a. 2%
 - b. one-half
 - c. 1%
 - d. None of the above

12. 20/60 vision means:
 - a. a person needs to be 20 feet away to clearly see what a normal person can see from 60 feet
 - b. a person needs to be 60 feet away to clearly see what a normal person can see from 20 feet

PRETEST

INSTRUCTOR'S SECTION

13. Which section of the ear contains the eardrum?
- a. external
 - b. middle
 - c. internal
14. You can test for conductive hearing loss by using a:
- a. otoscope
 - b. percussion hammer
 - c. tuning fork
 - d. ticking watch
15. When measuring blood pressure, the systolic reading tells you:
- a. how well blood is flowing through the veins
 - b. the heart's ability to function as a pump
16. When measuring blood pressure, the diastolic reading tells you:
- a. how well blood is flowing through the veins
 - b. the heart's ability to function as a pump

POSTTEST

INSTRUCTOR'S SECTION

17. Diagnose means:
- a. to cure
 - b. to identify
 - c. to treat
 - d. to heal
18. Auscultation involves:
- a. looking
 - b. feeling/touching
 - c. listening
 - d. tapping
19. Symptoms that the health care professional can see, feel, hear, smell, or measure are called:
- a. objective symptoms
 - b. subjective symptoms
20. A sphygmomanometer is used to:
- a. examine inside the ear
 - b. test vision
 - c. measure blood pressure
 - d. test reflexes
21. Normal body temperature is:
- a. 96.8°C
 - b. 96.8°F
 - c. 98.6°C
 - d. 98.6°F

POSTTEST

INSTRUCTOR'S SECTION

22. Which of the following is *not* a major assessment factor when taking a person's pulse:
- a. rate
 - b. location
 - c. rhythm
 - d. volume
23. Arrhythmia is a medical term meaning a person's pulse:
- a. is weak
 - b. is too fast
 - c. has an irregular pattern
 - d. is too slow
24. The apical pulse is usually:
- a. measured with a stethoscope
 - b. taken next to the heart
 - c. is measured when seated
 - d. all of the above
25. A cholesterol level of 200 - 239 mg/dl is considered:
- a. too low
 - b. good
 - c. borderline
 - d. too high

POSTTEST

26. The American Heart Association recommends that what percentage of your total daily calories should come from saturated fat?

- a. 5%
- b. 10%
- c. 15%
- d. 20%

27. Every time you reduce your overall cholesterol level by one percent, you reduce your risk of a heart attack by:

- a. 2%
- b. one-half
- c. 1%
- d. None of the above

28. 20/60 vision means:

- a. a person needs to be 20 feet away to clearly see what a normal person can see from 60 feet
- b. a person needs to be 60 feet away to clearly see what a normal person can see from 20 feet

INSTRUCTOR'S SECTION

POSTTEST

INSTRUCTOR'S SECTION

29. Which section of the ear contains the eardrum?
- a. external
 - b. middle
 - c. internal
30. You can test for conductive hearing loss by using a:
- a. otoscope
 - b. percussion hammer
 - c. tuning fork
 - d. ticking watch
31. When measuring blood pressure, the systolic reading tells you:
- a. how well blood is flowing through the veins
 - b. the heart's ability to function as a pump
32. When measuring blood pressure, the diastolic reading tells you:
- a. how well blood is flowing through the veins
 - b. the heart's ability to function as a pump

POSTTEST

- 33. palpetation
- 34. stethoscope
- 35. radial
- 36. apical
- 37. cholestamol
- 38. acuity
- 39. sistolic
- 40. diastolic

INSTRUCTOR'S SECTION

SPELLING TEST

TEST ANSWERS

- | | |
|------|-------|
| 1. b | 9. d |
| 2. c | 10. b |
| 3. a | 11. a |
| 4. c | 12. a |
| 5. d | 13. a |
| 6. b | 14. b |
| 7. c | 15. b |
| 8. d | 16. a |

- | | |
|-------|-------|
| 17. b | 25. d |
| 18. c | 26. b |
| 19. a | 27. a |
| 20. c | 28. a |
| 21. d | 29. a |
| 22. b | 30. b |
| 23. c | 31. b |
| 24. d | 32. a |

33. b
34. a
35. a
36. a
37. b
38. a
39. b
40. a

INSTRUCTOR'S SECTION

PRETEST ANSWERS

POSTTEST ANSWERS

SPELLING TEST ANSWERS

EVALUATION SUMMARY

10 POINTS EACH

Pretest _____

Checklist for Objective 1:
Maintain and calibrate medical
equipment _____

Checklist for Objective 2: Assess
basic health signs _____

Checklist for Objective 3: Interpret
cholesterol test results _____

Checklist for Objective 4:
Calculate dietary intake of
cholesterol and saturated fat _____

Checklist for Objective 5: Evaluate
vision _____

Checklist for Objective 6: Evaluate
hearing _____

Report for Objective 7: Research
and report on diagnostic tests _____

Checklist for Objective 8: Obtain
blood pressure reading _____

Career Search _____

INSTRUCTOR'S SECTION

1. PROCESS EVALUATION



1. PROCESS
EVALUATION
SCORE _____

EVALUATION SUMMARY

Posttest Score: _____

EVALUATION WORKSHEET

1. Process evaluation score = _____
2. Written evaluation score = _____
3. Total score = _____

INSTRUCTOR'S SECTION

2. WRITTEN EVALUATION



2. WRITTEN EVALUATION SCORE _____

*Total Score for TLA =
1+2 = 3*

Total Score/2 = Score

TLA SCORE _____

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Margaret A. Shea. *Mosby's Fundamentals
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INSTRUCTOR'S SECTION

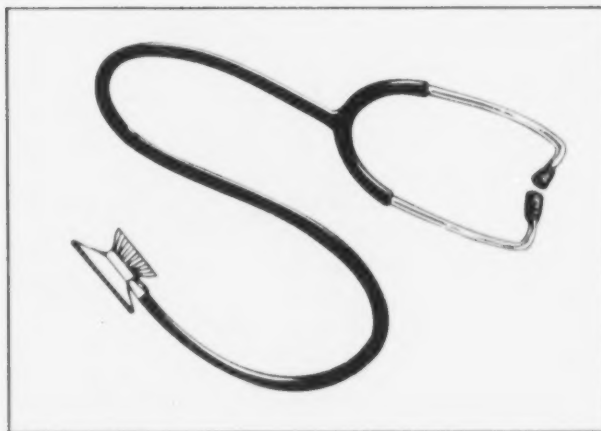
TECHNOLOGY EDUCATION

TECHNOLOGY LEARNING ACTIVITY

TE3208

DIAGNOSTIC CARE: GRADE 9

Suggested Time: 8 Days



Developed by the
Curriculum and Instructional Materials Center
for the Technology Education Division
Oklahoma Department of Vocational and Technical Education

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Oklahoma Department of Vocational and Technical Education
Stillwater, Oklahoma 74074-4364

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TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

On Day 1 you should complete the following activities:

- ① Complete Pretest
- ② Read Assignments to Turn In (items to completed in 8 days)
- ③ Read Goal
- ④ Read Words You Should Know
- ⑤ Read Priority Academic Student Skills
- ⑥ Read Objectives
- ⑦ Read Related TSA Competitive Events
- ⑧ Read Academic and Workplace Applications

DAY 1 ACTIVITIES



Reading Comprehension

- Gain factual information
- React to written material

Functional Reading

- Follow written instructions
- Use content area vocabulary

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

You will need a computer scan sheet or card to record your answers to the following Pretest. Be sure to write your name, the title of the TLA, the date, and the class period on the computer scan sheet or card using a #2 pencil. Use rows 1-16 to record the answers to the Pretest. If your answers will be hand-scored, use a blank sheet of paper to record your answers and number your answers 1-16.

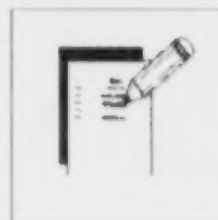
Get Pretest Questions from your instructor.

When you finish the Pretest, return the test form and the computer scan card or notebook paper to your instructor.

DAY 1 ACTIVITIES



PRETEST INSTRUCTIONS



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

At the end of 8 days, you should give the following items to your instructor for evaluation:

1. Computer score card/sheet, with answers to:
 - a) Pretest
 - b) Posttest (including spelling test)
2. Checklist for Objective 1
3. Checklist for Objective 2
4. Checklist for Objective 3
5. Checklist for Objective 4
6. Checklist for Objective 5
7. Checklist for Objective 6
8. Written report for Objective 7
9. Checklist for Objective 8
10. Career Search Activity
 - a) Two careers identified
 - b) Explanation of why those occupations appealed to you

DAY 1 ACTIVITIES



ASSIGNMENTS TO TURN IN

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

The Diagnostic Care: Grade 9 TLA will help you learn about various types of diagnostic care. You will learn how to perform basic diagnostic/assessment procedures and research careers within this health care field.

DAY 1 ACTIVITIES



GOAL

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

abdomen — stomach area
apex — the top or highest point
apical pulse — pulse location next to the heart
artery — major veins through which blood flows
astigmatism — blurred vision due to irregularities within the eye
calibrate — adjusting an instrument so it measures accurately
cardiovascular — pertaining to the heart
circumference — the distance around an object, typically a circular or oval shaped object
diastolic pressure — the lowest pressure of blood against an artery when the heart is relaxed
fast — to go without food
hyperopia — farsightedness; difficulty in seeing things up close
myopia — nearsightedness; difficulty in seeing things at a distance
objective symptoms — those that a person other than the patient can see, feel, fear, smell, or measure
palpate — to examine by feel or touch
peripheral pulse sites — those locations that are distant from the heart (wrist)
sphygmomanometer — an instrument used to measure blood pressure
stethoscope — an instrument for listening to sounds produced within the body
subjective symptoms — those which the patient experiences and are not easily observed

DAY 1 ACTIVITIES



WORDS YOU SHOULD KNOW

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

systolic — the highest pressure of blood
against an artery when the heart is
contracted

DAY 1 ACTIVITIES



WORDS YOU SHOULD KNOW

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

- You will know and appreciate the importance of technology and technological literacy.
- You will explore career opportunities so they can make meaningful occupational choices.
- You will apply problem solving and critical thinking techniques.
- You will apply math, science, reading, and other school subjects in a practical situation.
- You will develop basic skills in the safe and proper use of tools, machines, materials, processes, and technical concepts.
- You will think logically and sequentially.
- You will develop leadership, creative abilities, positive self-concepts, and individual potential in a technological society.
- You will communicate by making clear and relevant points through the development of mental process skills.

DAY 1 ACTIVITIES



PRIORITY ACADEMIC STUDENT SKILLS

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

At the completion of this Technology Learning Activity, you should be able to:

1. Maintain and calibrate medical equipment.
2. Assess basic health signs (temperature, weight, height, pulse).
3. Interpret cholesterol results.
4. Calculate dietary intake of cholesterol and saturated fat.
5. Evaluate vision.
6. Evaluate hearing.
7. Use professional resource materials to research and report on diagnostic tests.
8. Obtain blood pressure reading.

DAY 1 ACTIVITIES



OBJECTIVES

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

The following TLA Competitive Events apply to your study of *Diagnostic Care: Grade 9*.

- Research Paper (Objective 7)

See TSA Competitive Events Guidelines for specific details on the competitions.

DAY 1 ACTIVITIES



RELATED TSA COMPETITIVE EVENTS

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TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

The symbols in the right column are used to identify the Academic and Workplace Applications that are reinforced by specific activities in this TLA.

Reading Skills Applied:

Reading Comprehension

- Gain factual information
- React to written material

Research and Reference

- Use standard references

Functional Reading

- Interpret forms and records
- Follow written instructions
- Use content area vocabulary

Writing Skills Applied:

Language

- Use standard grammar, spelling, and capitalization
- State ideas clearly

Functional Writing

- Complete forms and records

Mathematics:

Operation and Calculation

- Calculate with whole numbers

Math Application

- Solve percent problems

Science:

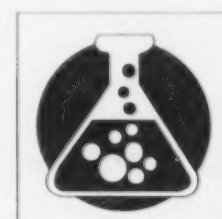
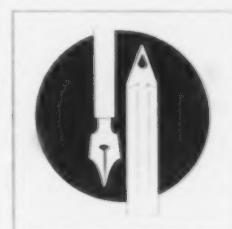
Life Science

- Investigate/apply principles of anatomy/physiology

DAY 1 ACTIVITIES



ACADEMIC AND WORKPLACE APPLICATIONS



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TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

Employability:

Job Search/Selection

- Analyze personal occupational aptitudes/preferences
- Investigate employment prospects of a career field/occupation
- Investigate training requirements for a career field/occupation
- Investigate benefits of a career field/occupation

Job Acquisition/Development

- Master specific job task / procedure

DAY 1 ACTIVITIES



ACADEMIC AND WORKPLACE APPLICATIONS



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TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

On Day 2 you should complete the following activities:

- ① Read Information Sheet
- ② Complete Objective 1

DAY 2 ACTIVITIES



SUMMARY OF ACTIVITIES



Reading Comprehension

- Gain factual information



Functional Writing

- Complete forms and records



Job Acquisition/Development

- Master specific job task / procedure

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TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 2
ACTIVITIES



INFORMATION SHEET

Diagnostics & Health Care

To diagnose is to identify.

A mechanic may run a diagnostic test on an engine to determine if it is running as smoothly as it should. A health care professional uses diagnostics to identify an illness or disease.

In medicine, the diagnostic process is very precise. It begins with an assessment. This involves a basic examination to ensure that a person's eyes, heart, or liver are functioning as they should.

The results of that initial assessment are then closely evaluated. Based upon those findings, other tests or examinations may be ordered. If a problem is identified or diagnosed, then a plan is developed to treat the disorder.

Depending upon the plan, many different health care professionals may be involved in patient care. This could include everyone from a surgeon to a pharmacist, from a nurse to a physical therapist.

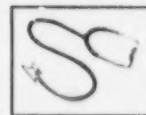
Basic Techniques

No matter their specialty, there are four basic assessment techniques health care professionals use to obtain data. These techniques require the use of your senses.

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TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 2 ACTIVITIES



Inspection means looking. Through inspection, you can examine the skin or determine how well patients move their extremities. Health care professionals use inspection constantly when dealing with patients.

Palpation means feeling. Tomorrow, you will palpate the radial artery to measure a person's pulse. Nurses and doctors often palpate the abdomen for signs of tenderness or palpate the skin for warmth or moisture.

Auscultation involves listening. A medical assistant may auscultate the lungs for breath sounds or the abdomen for bowel sounds. Tomorrow, you will use auscultation to listen to someone's heart beating. And you will use it once more towards the end of this course to measure blood pressure.

Percussion involves tapping. Doctors often use this technique as part of a routine medical exam. Tapping over the chest or abdomen will reveal to the experienced examiner the presence of fluid under the area percussed. Testing someone's knee-jerk reflex is also done by tapping.

NOTE: While not always recognized as a formal technique, your sense of smell is also important. For example, a very sweet odor of the breath or foul-smelling drainage from a wound could be important assessment findings.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 2 ACTIVITIES



Using these techniques during an examination provides you with information about a patient's objective symptoms. (Objective symptoms are those that you can see, feel, hear, smell, or measure.) Another equally important technique is to talk to the patient and ask questions. This will help you to determine the presence of subjective symptoms.

Subjective symptoms are those which the patient experiences and are not easily observed. Subjective symptoms include dizziness, nausea, and pain. Some objective and subjective symptoms may be linked together.

- Nausea (subjective) may precede vomiting (objective).
- Nail-biting (objective) may accompany anxiety (subjective).
- When patients experience an itching sensation (subjective), they may scratch the area (objective).

Basic Equipment

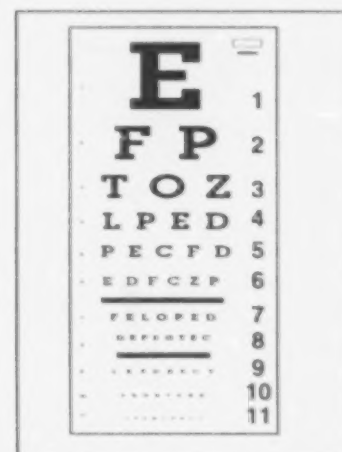
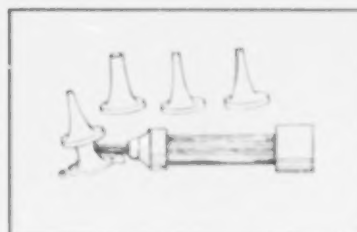
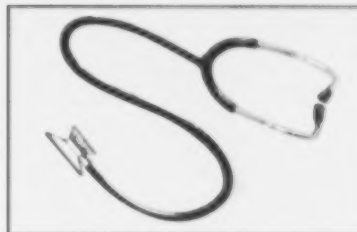
The following are examples of basic medical equipment used in a physical examination. You'll see examples of more sophisticated medical equipment in a reference book used later in this course.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 2 ACTIVITIES



- **Stethoscope** - used in the auscultation of blood pressure, apical pulse, breath sounds and bowel sounds
- **Otoscope** - used in the examination of the ears
- **Eye Chart** - used in the examination of the eyes

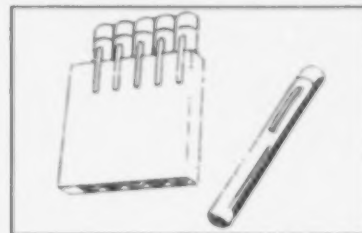


TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 2 ACTIVITIES



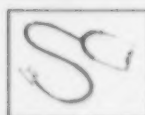
- Tongue blade - used to restrain the tongue when examining the throat
- Flashlight, penlight, or other light source - used to determine pupil reaction and to look into body cavities
- Gloves - used to examine body cavities or when handling specimens
- Percussion hammer - used for eliciting reflexes



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

- Tuning fork - used to assess hearing or the patient's ability to detect vibration

DAY 2 ACTIVITIES



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

Maintain and calibrate medical equipment

Knowing how to correctly use medical equipment is critical in performing diagnostic procedures. Yet if that equipment is not properly maintained or calibrated, then the results of those procedures are meaningless.

This activity will introduce you to some of the equipment you'll be using over the next few days and how to maintain and take care of those tools.

- Sphygmomanometer
- Stethoscope
- Tuning fork
- Snellen eye chart
- Alcohol swabs
- Photocopy of checklist on the next page

Ask your instructor where the equipment noted above is kept. Gather this equipment in your work area/station. Also be sure to ask your instructor for any of the manufacturers' operating or maintenance instructions for this equipment, especially those that came with the sphygmomanometer.

DAY 2 ACTIVITIES



OBJECTIVE 1

INTRODUCTION

TOOLS AND MATERIALS

PROCEDURE

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 2 ACTIVITIES



OBJECTIVE 1 CHECKLIST: Maintain/calibrate medical equipment

Mercury or Aneroid Sphygmomanometer

	Yes	No
Bulb/tubing free of cracks or leaks	☐	☐
Thumbscrew-valve operates correctly	☐	☐
Cuff inflates and does not leak	☐	☐
Gage operates correctly	☐	☐

Electronic Sphygmomanometer

	Yes	No
Perform manufacturer's calibration procedure	☐	☐
Other procedures performed:		
_____	☐	☐
_____	☐	☐
_____	☐	☐

Stethoscope

	Yes	No
Chestpiece securely connected to tubing	☐	☐
Diaphragm free of tears, rips, cracks	☐	☐
Binaurals securely connected to tubing	☐	☐
Earpieces securely connected to binaurals	☐	☐
External spring provides enough tension	☐	☐
Properly clean stethoscope	☐	☐

Eyechart

	Yes	No
Free of any rips, tears, stains, or wrinkles	☐	☐
Enough wall and floor space to conduct test	☐	☐

Tuning Fork

	Yes	No
Free of any cracks or nicks	☐	☐

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 2 ACTIVITIES

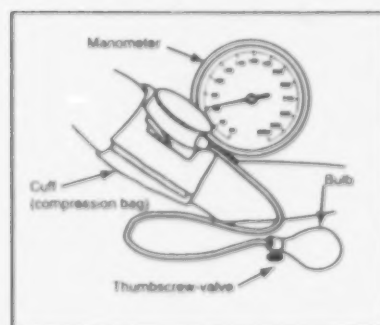
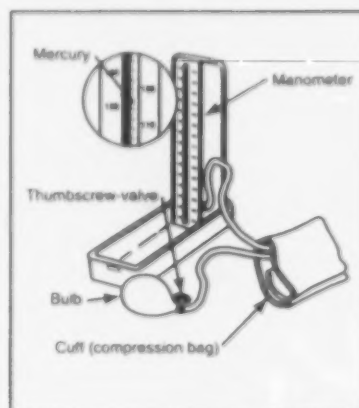


Maintain/calibrate sphygmomanometer

This is the most sophisticated piece of equipment you will use in this course. It is also, depending upon the model, the only one which may be required to be calibrated.

There are three types of sphygmomanometers:

- **Mercury sphygmomanometer -**
These models have a large, vertical, thermometer-like gauge.
- **Aneroid sphygmomanometer -**
These models have a gauge that attaches to the sphygmomanometer's cuff.



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 2 ACTIVITIES



- **Electronic sphygmomanometer -**
These models do not have a gauge, but rather an electronic digital display.

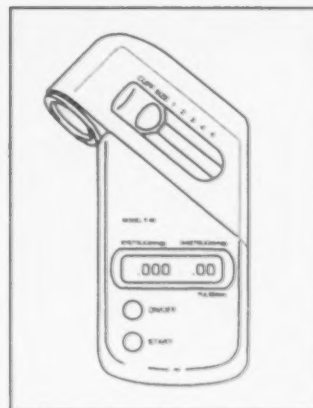
Carefully review the manufacturer's materials that came with the sphygmomanometer to determine if any calibration is needed. If so, follow the procedure outlined by the manufacturer.

If using an electronic sphygmomanometer,

- STEP 1:** Review and perform any other maintenance/calibration procedure recommended by the manufacturer. Then, after completing the checklist, proceed to the next piece of equipment

If using a mercury or aneroid sphygmomanometer, practice operating the equipment to ensure it is in good working order. Do not, at this point, place the cuff around your arm or that of a fellow student. Just lay it flat on a table. As you complete each step, mark it off on the checksheet.

- STEP 1:** Check the bulb and all tubing to make sure they are free from cracks which will cause leaks.
- STEP 2:** Close the thumbscrew-valve at the end of the bulb.



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 2 ACTIVITIES



- STEP 3:** Squeeze the bulb several times and check to see that:
- the cuff begins to inflate
 - the gauge, or manometer, rises
- STEP 4:** Continue to squeeze the bulb until the cuff is visibly inflated. Do not over-inflate the cuff.
- STEP 5:** Wait a few moments to see if the cuff begins to deflate on its own. If so, this may indicate a crack or leak. If there does seem to be a crack or leak, report this to your instructor.
- STEP 6:** If the cuff remains inflated, then loosen the thumbscrew-valve and check to see that:
- the cuff begins to deflate
 - the reading on the gauge begins to lower

Once you've completed this procedure, and the appropriate section of the checklist, read the manufacturer's materials to see if any more tests need to be done. If not, procede to the next piece of equipment.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 2 ACTIVITIES

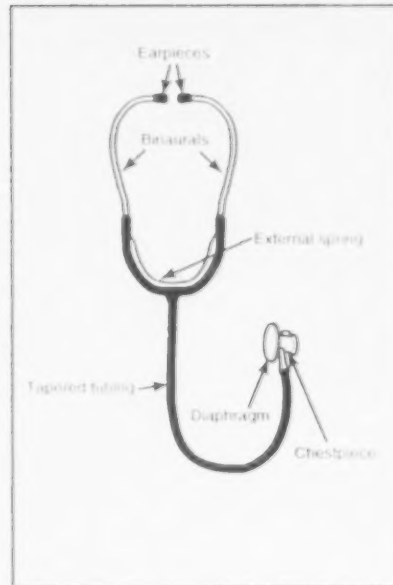


Maintain Stethoscope

The stethoscope is a very simple piece of medical equipment. The model you use should be similar in appearance to the one in this figure box.

The stethoscope, as well as the remaining pieces of equipment you'll be using, does not require calibration. Still, you need to check that it is in good working condition.

Review any of the manufacturer's materials that may have been packaged along with the stethoscope. Then perform the following steps, and complete the checklist section, to ensure the stethoscope is in good working condition:



WARNING: Do not clean the diaphragm while the earpieces are in your ear. The diaphragm greatly enhances sound. Also do not tap the diaphragm or speak into it while wearing the stethoscope.



STEP 1: The chestpiece is securely connected to the tubing.

STEP 2: There are no tears, rips, or cracks on the surface of the diaphragm.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 2 ACTIVITIES



- STEP 3:** The binaurals are securely connected to the tubing.
- STEP 4:** The earpieces are securely connected to the binaurals.
- STEP 5:** The external spring provides enough tension such that the earpieces will rest snugly in your ears.

Next, clean the following parts of the stethoscope:

- STEP 6:** Use the alcohol swabs to clean the earpieces.
- STEP 7:** Use the alcohol swabs to clean the diaphragm. Be careful not to damage the diaphragm by applying too much pressure.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

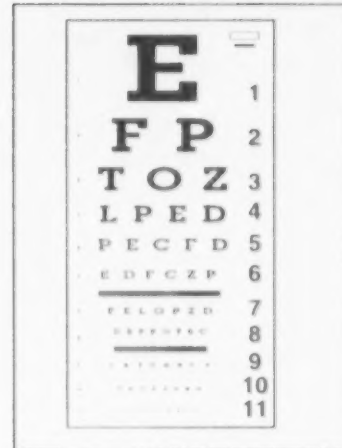
DAY 2 ACTIVITIES



Check Eye Chart

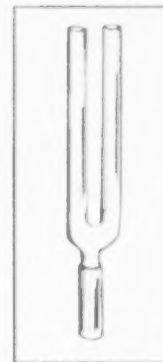
The eye chart itself doesn't require any maintenance, but you should check to see that it is free of any tears, rips, stains, or wrinkles that might prevent someone from reading what is on the chart.

When you reach the activity on checking someone's vision, you will need to place the chart on a wall at eye-level and have the patient stand twenty feet away from that wall. This might be a good time to look around the classroom for a place to perform this procedure. Then complete the eye chart section on the checklist.



Check Tuning Fork

The tuning fork requires even less care than the eyechart. All you need to do is look the fork over and make sure it doesn't have any cracks or nicks. And be sure to complete the appropriate checklist section. You may want to practice striking one of the prongs of the fork against the heel of your palm.



WARNING: Do not strike the fork against the edge of a table or any other hard, sharp surfaces as this will damage the instrument.



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 2 ACTIVITIES



When you have finished, return all of the equipment to your instructor. Be sure that the stethoscope is kept in a place that is easily accessible since you will be using it tomorrow.

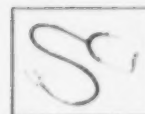
If you have time remaining, you can go on to Day 3 activities or you might want to review other types of diagnostic tests listed in the reference books your instructor has.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

On Day 3 you should complete the following activities:

- ① Read Information Sheets
- ② Complete Objective 2

DAY 3 ACTIVITIES



SUMMARY OF ACTIVITIES



Reading Comprehension

- Gain factual information



Functional Writing

- Complete forms and records



Operation and Calculation

- Calculate with whole numbers

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 3 ACTIVITIES



Life Science

- Investigate/apply principles of anatomy/physiology



Job Acquisition/Development

- Master specific job task / procedure

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

The foundation of diagnostic care is the assessment of basic health signs. These signs include a person's temperature, height, weight, and pulse.

TEMPERATURE

Body temperature is a balance between heat lost and heat produced. Most body heat is produced by metabolism of food and by exercise. Heat is lost primarily through the skin, through the loss of body fluids, and through the lungs when you exhale.

Normal body temperature is 98.6 degrees Fahrenheit (F). Yet there are many different factors which can influence body temperature:

- Age - A person's age can cause slight variation in expected normal temperatures. Newborns have difficulty maintaining body temperature because of their immature nervous systems. And their environment can influence their temperature greatly.

Older infants and children tend to have slightly higher temperature than adults. Older adults, however, tend to have slightly lower body temperature.

- Time of day - Lowest temperatures in a 24-hour-period will be in the early morning hours. Highest temperatures will be recorded during the evening hours. Those people who sleep during day and work at night, however, will have their peak and low temperature times reversed.

DAY 3 ACTIVITIES



INFORMATION SHEET

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 3 ACTIVITIES



- Exercise - Your body temperature increases when you exercise.
- Stress - This too can cause an increase in body temperature.
- Illness - Depending on what type of illness a person has, body temperature can increase or decrease.

You can use glass or electronic thermometers to assess temperature. With a glass thermometer, three sites are commonly used:

- Oral - This route requires that the mouth be kept closed with the thermometer under the tongue. Therefore it is not appropriate for infants and small children, unconscious or disoriented patients, individuals with a history of seizures, patients with mouth trauma or oral surgery, or people who must breathe through the mouth. A normal oral temperature is 98.6°F.
- Rectal - This requires longer time for accurate measurement. It should not be used for patients with certain illnesses and conditions, or for individuals who cannot assume the proper position. Measurements of rectal temperature are higher when compared with oral temperatures. A normal rectal temperature is considered to be 99.6°F.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 3 ACTIVITIES



- Axillary - Here the thermometer is placed under a person's armpit. This requires a longer period of time to get an accurate reading. Axillary temperatures are lower when compared with oral readings. A normal axillary temperature is considered to be 97.6°F.

When electronic thermometers are used, oral, rectal, and axillary sites may be chosen. There is also an electronic thermometer which measures temperature at the tympanic membrane in the ear.

While all electronic thermometers require less time than glass thermometers, the tympanic thermometer records temperature in about two seconds. Readings can be calibrated to correspond with either oral or rectal readings.

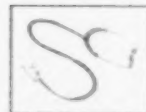
HEIGHT & WEIGHT

Both genetics and nutrition will affect a person's height and weight. And while little can be done to influence the height of a person, we can control weight.

Diet and exercise are the most effective ways to maintain proper body weight. Through exercise you burn the calories you take in when eating. Keeping an eye on what you eat, however, is equally important. Tomorrow's activities will help you do just that.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 3 ACTIVITIES



PULSE

The heart is a pump made of muscle tissue that sends blood throughout your body. By contracting and expanding—in much the same way your hand does when forming a fist and then relaxing—the heart muscle pumps blood through your veins. This pumping action causes the blood to flow in a wave-like fashion. This fluid wave is what you actually feel when taking someone's pulse.

Taking a person's pulse helps determine the efficiency of their heart and circulation. When taking someone's pulse, there are three major assessment factors to be considered:

- Rate
- Rhythm
- Volume

Rate

The pulse rate refers to the number of beats per minute. A person's pulse rate is influenced by a number of factors.

- Age - As people get older, their pulse rate decreases. Average pulse rates for different ages include:
 - Newborn 100-160
 - Age 4 80-120
 - Mid-teens 70-110
 - Adult 60-100

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 3 ACTIVITIES



- Exercise and activity influence the pulse rate. For example, when doing aerobic exercises, the pulse rate increases. However, after doing aerobic exercises on a regular basis, a person's "resting" or normal pulse rate will actually decrease. That's because this type of exercise makes the heart stronger and able to supply blood with fewer beats.
- Physical position can influence the pulse rate. Lowest rates can be expected when the individual is lying down. The rate is higher when sitting and even higher when standing.
- The sex of a person makes a slight difference in the pulse rate. Males average a slightly slower heart rate than females.
- Stress, emotions, and pain can all increase the heart rate. Think back to the last time you were suddenly startled or frightened. Did you sense your heart beating faster?

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 3 ACTIVITIES



- Many other factors influencing the pulse rate. These include:
 - body temperature (higher temperature increases pulse, lower temperature decreases pulse)
 - medication and drugs
 - the amount of blood circulating within a person and the components within blood, such as red blood cells

Rhythm

Rhythm refers to the pauses or "spacing" between beats. You should expect to find the same amount of space between beats when taking a person's pulse. When put into diagram form, a regular pulse rate might look something like this:

beat----beat----beat----beat----
beat----beat

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 3 ACTIVITIES



If the spacing between beats is not equal, then the pulse's rhythm is irregular. The medical term for this is arrhythmia. When arrhythmia is detected, it should be determined if the same pattern repeats or whether the pattern is variable.

Arrhythmia with pattern:

*beat---beat----beat---beat----beat---
beat----beat---beat*

Variable arrhythmia:

*beat---beat---beat----beat---beat-
beat----beat*

Volume

Volume does not refer to how loudly a person's heart is pumping. Rather, in this instance, volume relates to the amount of blood pumped with each beat. You can determine this by the strength or quality of the beats. Normally a pulse should be felt with only slight pressure of the fingertips.

- A "weak" pulse is difficult to feel; applying too much pressure may make it impossible to feel.
- A "full or bounding" pulse remains strong even with pressure.

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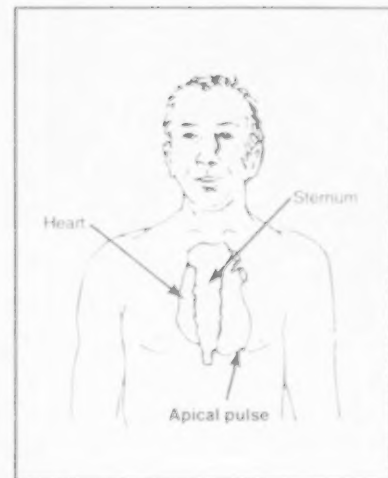
DAY 3 ACTIVITIES



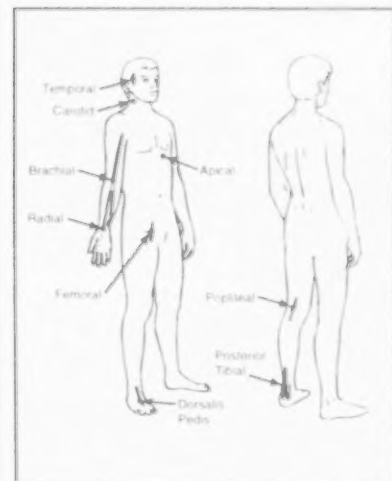
Locations on the body where pulse may be assessed

There are a number of sites on the body where pulse may be assessed.

The apical pulse is assessed by listening over the apex of the heart with a stethoscope. Two sounds are heard which correspond to one beat. These sounds are often described as "lub-dub". An apical pulse is usually obtained for children under five years old.



All the other pulse sites are called peripheral pulses since they are distant from the heart. They are all assessed by palpation. The radial pulse at the wrist is most often assessed. The brachial pulse is most often used for obtaining blood pressure. Other sites are used when it is desirable to assess circulation in another area.



In today's activity, you will learn how to assess the apical pulse and the radial pulse.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 3 ACTIVITIES



OTHER BASIC HEALTH SIGNS

The activities you'll be doing in just a few minutes cover how to assess the health signs you've just read about: temperature, height, weight, and pulse. Yet there are a few other basic health signs with which you should be familiar.

- Level of consciousness - Is the patient alert and does the patient respond when to verbal stimuli?
- Pupil reaction - Are the pupils equally round? Do they constrict or "shrink" when a light is shined into the eyes. Do they dilate or "expand" when the light is removed? Do the pupils constrict and dilate equally and rapidly?
- Motor function - Can the patient move arms and legs on command? Can the patient grip with both hands? Can the patient push both feet equally against an object?
- Skin color - Nail beds should be pink. They are extensions of the skin and the same color regardless of skin color.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

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- Sensation - With their eyes closed, patients should be able to identify which part of their body is being touched. If they can properly identify the little finger or big toe, you know that messages are being properly sent to the brain.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

Assess basic health signs (temperature, weight, height, pulse)

Knowing how to assess basic health signs is critical to providing diagnostic care. In this activity, you will learn how to assess a person's temperature, weight, height, and pulse.

- Oral thermometer
- Thermometer sheaths
- Tympanic thermometer
- Scale
- Measuring tape or yardstick
- Stethoscope
- Alcohol swabs
- Watch with second hand
- Pen and paper
- Photocopy of checklist

Getting Ready

Gather all of the necessary equipment and supplies, including a copy of the following page. Check with your instructor to see if any of the items listed above will be made available to you through the school nurse's office.

If you are working with a partner, you can assess each other. If you do not have a partner, ask if you can assess your instructor or if your instructor can request another student to help you.

DAY 3 ACTIVITIES



OBJECTIVE 2

INTRODUCTION

TOOLS AND MATERIALS

PROCEDURE

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 3 ACTIVITIES



OBJECTIVE 2 CHECKLIST: Assess basic health signs

Patient Info

Oral temperature _____ Tympanic temperature _____

Height _____ Weight _____

Radial Pulse

What was the pulse rate? _____

Was the pulse within normal limits for the patient's age? _____

Was the pulse strong and easily palpated? _____

Did you notice anything unusual about the rhythm and volume of the pulse? If so, what?

Apical Pulse

What was the pulse rate? _____

Was the pulse within normal limits for the patient's age? _____

Was the pulse strong? _____

Did you notice anything unusual about the rhythm and volume of the pulse? If so, what?

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DAY 3 ACTIVITIES



ASSESSING ORAL TEMPERATURE

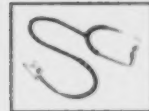
Temperature is frequently assessed both in the health care facility and in the home. Accurate readings depend on the technique used.

NOTE: It is common practice to assess the pulse while the thermometer is in place. This uses the waiting time more efficiently. However, since learning how to assess a person's pulse is difficult the first few times, it is best to do these procedures one at time until you've mastered them.

- STEP 1:** Determine whether the patient has had anything to eat, drink, or smoke in the last 15-30 minutes. Oral temperatures will be influenced by temperatures of substances in the mouth within this time period.
- STEP 2:** Observe the skin for a flushed or pale appearance.
- STEP 3:** Feel the skin to determine whether it is warmer or cooler than expected and whether moisture is present.
- STEP 4:** Observe for shivering.
- STEP 5:** Wash hands.
- STEP 6:** If the thermometer has been

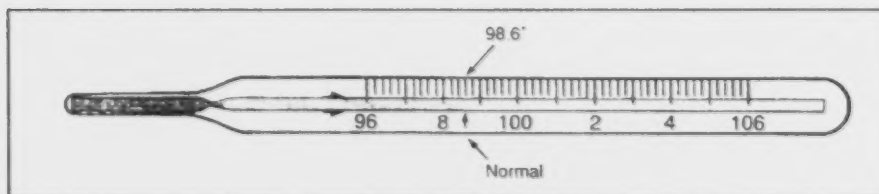
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stored in antiseptic solution, rinse with cold running water and dry it with a tissue.

- STEP 7:** Check to see that the thermometer reading is below 95°F.
- STEP 8:** Insert the thermometer into the disposable sheath.
- STEP 9:** Place the bulb of the thermometer under the tongue and instruct the patient to close lips tightly around the thermometer.
- STEP 10:** After 3 minutes have passed, remove the thermometer.
- STEP 11:** Use a tissue to remove the sheath and to wipe from the stem to the bulb.
- STEP 12:** Hold at eye level to read the thermometer. Record the reading on the checklist.



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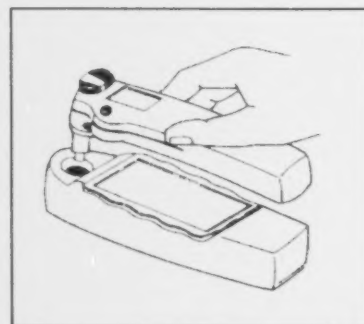


STEP 13: Clean the thermometer and replace it in the designated area.

ASSESSING TYMPANIC TEMPERATURE

One particular type of electronic thermometer makes taking temperatures extremely fast. Using a tympanic thermometer, you can obtain a temperature reading in 2-5 seconds. The ear is the site where the temperature is taken. This makes it easily accessible in patients of all ages with a minimum of effort.

- STEP 1:** Observe the ears for any drainage.
- STEP 2:** Observe the skin for a flushed or pale appearance.
- STEP 3:** Feel the skin to determine whether it is warmer or cooler than expected and whether moisture is present.
- STEP 4:** Observe for shivering.
- STEP 5:** Wash hands.
- STEP 6:** Remove the probe from storage.
- STEP 7:** Place probe cover on probe.



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DAY 3 ACTIVITIES



STEP 8: Gently restrain the patient's head by placing your hand alongside the patient's head.

STEP 9: Insert probe into ear canal just enough to seal opening.

CAUTION! EAR INJURY POSSIBLE. A probe that is forced into the ear canal can cause patient pain and injury. Do not force the probe into the patient's ear.



STEP 10: Press button or switch to activate the unit or follow manufacturer's directions for the thermometer being used.

STEP 11: When unit signals temperature has been obtained, remove the probe from the ear.

STEP 12: Read the temperature on the display panel. Record the reading on the checklist.

STEP 13: Eject probe cover from unit into trash receptacle or on to paper towel for transport to trash.

STEP 14: Replace probe in storage position. Make sure it is stored correctly for recharging.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 3 ACTIVITIES



ASSESSING WEIGHT

Accurate assessment of weight is important for the following reasons:

- Weight is often the basis for calculating medication dosage.
- Weight loss or gain is an indication of fluid balance.
- Weight and height together help in evaluating nutritional status.

NOTE: Aside from the typical household scale with which you are familiar, medical facilities typically use standing balance scales. The following procedure is based on use of a standing balance scale. Check with your instructor to see if such a scale is available for use at your school.

- STEP 1:** Ask the patient to take off shoes.
- STEP 2:** Place paper towel on platform to prevent bare feet from contacting scale.
- STEP 3:** Ask patient to stand on platform.
- STEP 4:** Move large slide on bottom balance arm to the right at estimated position.

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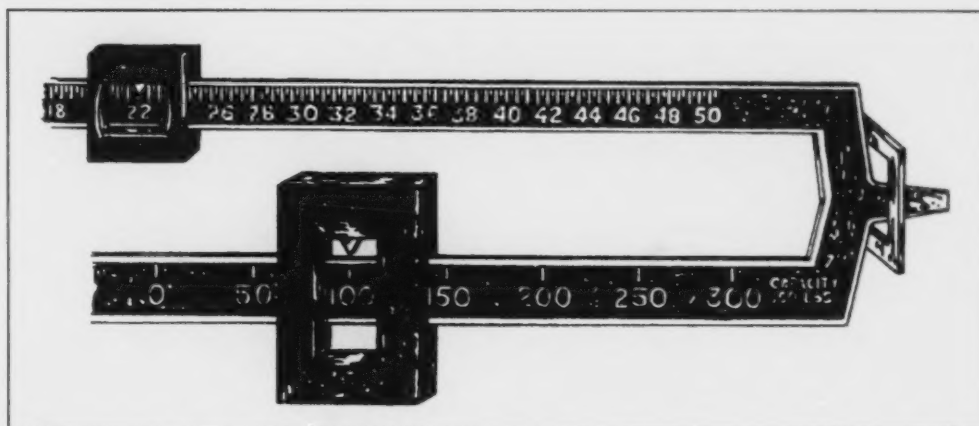
DAY 3 ACTIVITIES



STEP 5: Move the smaller slide on top balance arm to right until the arm is balanced at the midpoint.

STEP 6: Add numbers where weights are resting on the bottom and the top balance arms to determine weight. In the example below, the patient's weight is 122 pounds.

STEP 7: Record the patient's weight on the checklist.



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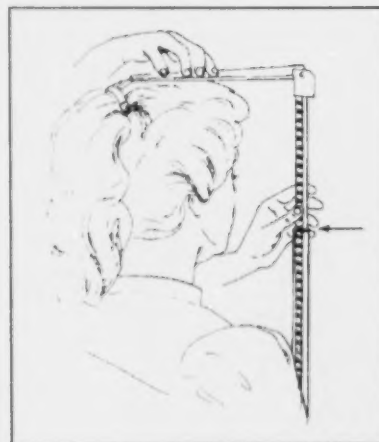
DAY 3 ACTIVITIES



ASSESSING HEIGHT

Height is assessed to help determine whether a patient's weight is appropriate. Many standing balance scales have an attachment for measuring height and the following procedure is based on using such an attachment. If a standing balance scale is unavailable to you, assess height with a measuring tape or yardstick.

- STEP 1: Ask the patient to take off shoes.
- STEP 2: Place paper towel on platform to prevent bare feet from contacting scale.
- STEP 3: Ask patient to stand on platform.
- STEP 4: Raise measuring device up above patient's head.
- STEP 5: Have patient stand to full height with weight evenly distributed on both feet.
- STEP 6: Pull horizontal arm of measuring device down until it touches the top of the patient's head.
- STEP 7: Record the greatest number visible as the patient's height on the checklist.



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 3 ACTIVITIES



ASSESSING PULSE

The radial (artery) is the most common site for pulse assessment. It is readily accessible with a minimum of effort.

The apical pulse is obtained by listening with a stethoscope. It is more accurate and reveals more information than pulse assessed by palpitation. Infants and small children should always have apical pulse assessed because of the difficulty in obtaining an accurate pulse by palpation.

- STEP 1: Sanitize your hands. (Use alcohol swabs or other sanitizing wash your instructor may have.)
- STEP 2: Clean the earpieces and diaphragm of the stethoscope with alcohol swabs.
- STEP 3: Explain to the patient that you will be assessing both the radial and apical pulse. Mention where on the body each type of pulse will be assessed. Be sure the patient understands this is a painless procedure and ask the patient to remain relaxed.
- STEP 4: Note on your checklist anything that you feel might influence the patient's pulse rate. Refer to the Rate section in the previous information sheet. Also ask if the

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 3 ACTIVITIES



patient knows of anything that might be influencing the pulse rate. (Did you take any medicine this morning? Are you under stress?)

Assessing The Radial Pulse

STEP 5: Place the patient's wrist in a relaxed, well-supported position with wrist extended and palm down.

STEP 6: Place the tips of your first three fingers over the patient's radial artery located along the "thumb side" of the patient's wrist.

NOTE: Avoid using your thumb to palpate the patient's pulse. If you do so, you may end up sensing your own pulse instead of the patient's!

STEP 7: Press lightly until the patient's pulse can be felt.

STEP 8: When the pulse is felt, look at the watch and count the number of beats you feel in a full minute.



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 3 ACTIVITIES



NOTE: *Once you have gained experience in assessing someone's pulse, you may wish to count for 30 seconds and multiply by two to obtain the rate for one minute.*

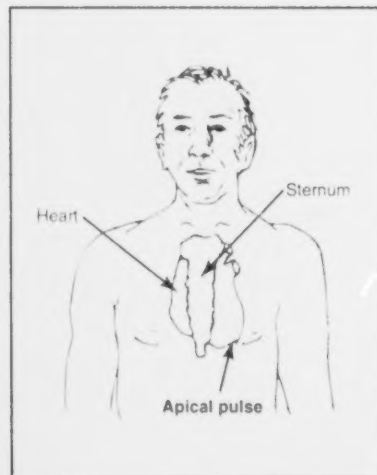
STEP 9: Assess if the pulse seems regular or irregular.

STEP 10: Assess the pulse's volume or strength.

Evaluating/Documenting The Radial Pulse

STEP 11: Answer the following questions regarding the patient's radial pulse. Record your answers on your checklist.

- a. What was the pulse rate? (How many beats did you count during the minute?)
- b. Was the pulse within normal limits for the patient's age?
- c. Was the pulse strong and easily palpated?



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 3 ACTIVITIES



- d. Did you notice anything unusual about the rhythm and volume of the pulse?

Assessing The Apical Pulse

- STEP 12: Have the patient assume a sitting position.
- STEP 13: Ask the patient to place the stethoscope's diaphragm over the apical pulse location.
- STEP 14: Listen for the "lub-dub" sound of the apical pulse.

NOTE: These two sounds count as one beat.

- STEP 15: Count the apical pulse rate for one minute.
- STEP 16: Assess if the pulse seems regular or irregular.
- STEP 17: Assess the pulse's volume.

Evaluating/Documenting The Apical Pulse

- STEP 18: Answer the following questions regarding the patient's apical pulse. Record your answers on your checklist.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 3 ACTIVITIES



- a. What was the pulse rate? (How many beats did you count during the minute?)
- b. Was the pulse within normal limits for the patient's age?
- c. Was the pulse strong?
- d. Did you notice anything unusual about the rhythm/volume of the pulse?
- e. Did you hear any extra sounds other than the typical "lub-dub"?

If you finish day three with time left over, ask your instructor for permission to assess the pulse of other students. Or have your pulse measured before and after doing a set of jumping jacks and see if it increases.

At the end of the period, be sure all of the equipment and supplies you have used are properly stored.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

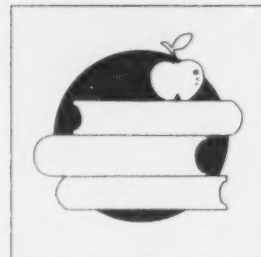
On Day 4 you should complete the following activities:

- ① Read Information Sheet
- ② Complete Objective 3
- ③ Complete Objective 4

DAY 4 ACTIVITIES



SUMMARY OF ACTIVITIES

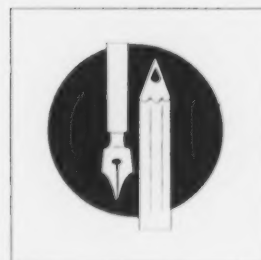


Reading Comprehension

- Gain factual information

Functional Reading

- Interpret forms and records



Functional Writing

- Complete forms and records

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 4 ACTIVITIES



Operation and Calculation

- Calculate with decimals

Math Application

- Solve percent problems



Life Science

- Investigate/apply principles of anatomy/physiology

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

Heart disease is one of the major causes of death in the United States. There are many different diagnostic tests that can be performed to evaluate the condition of the heart. Monitoring a person's heart rate while exercising, such as running on a treadmill, is a common procedure. Other tests involve the use of ultrasound or magnetic resonance imaging. Both of these procedures use sophisticated equipment to see inside the body.

Another test is to measure the level of cholesterol in the blood. High levels of cholesterol may indicate that a person is at risk for developing coronary heart disease or having a heart attack. Further testing is needed to confirm the presence of heart disease.

What Is Cholesterol

Cholesterol is a substance which the body uses to make different types of tissue. Your body makes cholesterol naturally. Cholesterol also enters your blood stream from the different foods you eat.

Because cholesterol doesn't dissolve in blood, if you have too much cholesterol it will begin to "stick" to the walls of your arteries. This can lead to heart disease.

DAY 4 ACTIVITIES



INFORMATION SHEET

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 4 ACTIVITIES



Levels Of Cholesterol

Cholesterol is measured in milligrams per deciliter of blood. This is abbreviated as mg/dl. Cholesterol levels of:

- 200 mg/dl and below are considered good.
- 200 - 239 mg/dl are considered borderline.
- 240 mg/dl and above indicate high risk.

Only a small amount of blood is needed to get a cholesterol reading. Often the blood is taken from a person's fingertip which has been pricked with a needle.

Additional Cholesterol Testing

If the initial cholesterol reading is high, or if heart disease is suspected for another reason, further testing may be done. This additional testing divides the cholesterol level into two parts:

- HDL-cholesterol (high density lipoprotein)
- LDL-cholesterol (low density lipoprotein)

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 4 ACTIVITIES



HDL is considered to be "good" because it actually helps remove excess cholesterol in the body. Readings from 40 -60 mg/dl are considered average, depending upon a person's sex. Readings less than 35 mg/dl are an indication that a person is at risk for developing heart disease.

High levels of LDL, however, are bad since it is this type that of cholesterol that sticks to arteries. LDL-cholesterol levels of:

- 130 mg/dl and below are good.
- 131-159 mg/dl are considered borderline.
- 160 mg/dl and above indicate high risk.

How To Adjust Cholesterol Levels

The American Hearth Association states that every time you reduce your overall cholesterol level by one percent, you reduce your risk of a heart attack by two percent.

To maintain health, you want to:

- Keep your overall cholesterol level below 200 mg/dl

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 4 ACTIVITIES



- Keep your HDL cholesterol level above 35 mg/dl
 - 40 - 50 mg/dl is average in males
 - 50 - 60 mg/dl is average in females
- Keep your LDL cholesterol level below 130 mg/dl

Diet, exercise, and maintaining a healthy lifestyle are the best ways to adjust cholesterol. The American Heart Association makes the following recommendations to people who need to adjust their cholesterol levels.

Persons who need to raise their HDL cholesterol are encouraged to:

- Become more physically active
- Lose weight
- Quit smoking

Persons who need to lower their LDL cholesterol are encouraged to:

- Become more physically active
- Quit smoking

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 4 ACTIVITIES



- Eat a low fat diet
 - eat fewer animal and dairy products
 - eat more fruits and vegetables

Adjusting dietary intake of fats is the one of the best ways to lower your overall cholesterol level and your LDL cholesterol level. Your body not only gets cholesterol from cholesterol in the food you eat, but also turns the saturated fat in those foods into cholesterol. That's why the American Heart Association recommends people:

- Eat an average of 300 milligrams of cholesterol per day
- Limit intake of saturated fat to less than 10 percent of total calories

Reading the Nutrition Facts information found on most packed food and doing some simple math is a good way to monitor the cholesterol and fat in your diet.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

Interpret cholesterol test results.

As mentioned earlier, the American Heart Association states that every time you reduce your overall cholesterol level by one percent, you reduce your risk of a heart attack by two percent.

In this activity, you will be provided with two sets of cholesterol test results for different persons. You will use these results to determine:

- How much, expressed as a percentage, these people have lowered their risk of a heart attack.
 - Based on the second set of test results, determine which persons still need to adjust their cholesterol level.
-
- Calculator
 - Copy of checklist

DAY 4 ACTIVITIES



OBJECTIVE 3

INTRODUCTION

TOOLS AND MATERIALS



OBJECTIVE 3 CHECKLIST:
Interpreting cholesterol test results

Patient 1: Alice

Did Alice lower or raise her risk of a heart attack? _____
By what percentage did Alice lower or raise her risk? _____
Given the breakdown between HDL and LDL in her second test, what
recommendations would you make? _____

Patient 2: Manuel

Did Manuel lower or raise his risk of a heart attack? _____
By what percentage did Manuel lower or raise her risk? _____
Given the breakdown between HDL and LDL in his second test, what
recommendations would you make? _____

Patient 3: Joshua

Did Joshua lower or raise his risk of a heart attack? _____
By what percentage did Joshua lower or raise her risk? _____
Given the breakdown between HDL and LDL in his second test, what
recommendations would you make? _____

Patient 4: Rhonda

Did Rhonda lower or raise her risk of a heart attack? _____
By what percentage did Rhondalower or raise her risk? _____
Given the breakdown between HDL and LDL in her second test, what
recommendations would you make? _____

Patient 5: Sarah

Did Sarah lower or raise her risk of a heart attack? _____
By what percentage did Sarah lower or raise her risk? _____
Given the breakdown between HDL and LDL in her second test, what
recommendations would you make? _____

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

Getting Ready

This example shows the type of calculations you need to before to complete this activity. If you have any questions after reviewing this example, ask your instructor for assistance.

Steve's first total cholesterol reading:
250 mg/dl

(breakdown between HDL/LDL not
available)

Steve's second total cholesterol
reading: 200 mg/dl

HDL: 45 mg/dl

LDL: 155 mg/dl

In terms of percentage, by how much as
Steve reduced his risk of a heart attack?

Given the breakdown of Steve's second
reading, what does he need to do to
further reduce his risk?

To determine how much Steve has reduced
his risk:

STEP 1: Subtract the second reading from
the first reading:

$$250 - 200 = 50$$

DAY 4 ACTIVITIES



PROCEDURE

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 4 ACTIVITIES



STEP 2: This result, 50, is expressed as a number. To turn it into a percentage, divide it by the initial cholesterol reading:

$$50 \div 250 = 0.2$$

Then multiply that result by 100:

$$0.2 \times 100 = 20\%$$

STEP 3: This represents the percentage difference between the two cholesterol readings. To determine the reduction in risk of a heart attack, that percentage needs to be doubled:

$$20\% \times 2 = 40\%$$

By lowering his overall cholesterol reading from 250 to 200, Steve has reduced his risk of a heart attack by 40%.

While this is very good, given the breakdown between HDL and LDL in his second reading, Steve is still at some risk. That's because his LDL level is borderline (between 131-159 mg/dl). To lower his LDL level, Steve should reduce the amount of fat in his diet, exercise more, and quit smoking if he currently does smoke.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 4 ACTIVITIES



Interpreting cholesterol test results

On the checklist, record the percentage by which each of the following persons have reduced their risk of a heart attack. Also, given the breakdown of their second cholesterol reading, make any necessary recommendations on what they should do next.

Keep in mind that to maintain health, you want to:

- Keep your overall cholesterol level below 200 mg/dl
- Keep your HDL cholesterol level above 35 mg/dl
 - 40 - 50 mg/dl is average in males
 - 50 - 60 mg/dl is average in females
- Keep your LDL cholesterol level below 130 mg/dl

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 4 ACTIVITIES



Patient 1: Alice, 37 year old female

First total cholesterol reading: 250
mg/dl

(HDL/LDL breakdown not
available)

Second total cholesterol reading:
225 mg/dl

HDL: 68 mg/dl

LDL: 157 mg/dl

Patient 2: Manuel, 27 year old male

First total cholesterol reading: 235
mg/dl

(HDL/LDL breakdown not
available)

Second total cholesterol reading:
177 mg/dl

HDL: 48 mg/dl

LDL: 129 mg/dl

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 4 ACTIVITIES



Patient 3: Joshua, 59 year old male

First total cholesterol reading: 252
mg/dl

(HDL/LDL breakdown not
available)

Second total cholesterol reading:
240 mg/dl

HDL: 33 mg/dl

LDL: 207 mg/dl

Patient 4: Rhonda, 17 year old female

First total cholesterol reading: 212
mg/dl

(HDL/LDL breakdown not
available)

Second total cholesterol reading:
188 mg/dl

HDL: 42 mg/dl

LDL: 146 mg/dl)

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 4 ACTIVITIES



Patient 5: Sarah, 43 year old female

First total cholesterol reading: 226
mg/dl

(HDL/LDL breakdown not
available)

Second total cholesterol reading:
235 mg/dl

HDL: 52 mg/dl

LDL: 183 mg/dl

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

Calculate dietary intake of cholesterol and saturated fat.

Aside from the cholesterol naturally produced in your body, cholesterol also enters your blood from the foods that you eat.

There are two basic dietary sources of cholesterol: the cholesterol that naturally occurs in the food itself—most meats and animal products contain cholesterol—and saturated fat that your body converts into cholesterol. That's why the American Heart Association recommends people:

- Eat an average of 300 milligrams (mg) of cholesterol per day
- Limit intake of saturated fat to less than 10 percent of total calories

Reading the Nutrition Facts information found on most packed food and doing some simple math is a good way to monitor the cholesterol and fat in your diet.

In this activity, you will be provided Nutrition Facts labels similar to those found on packages and nutrition guides. For each individual label, you will be asked to:

- Determine if the amount of cholesterol per serving exceeds the recommended daily limit.

DAY 4 ACTIVITIES



OBJECTIVE 4

INTRODUCTION

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 4 ACTIVITIES



- Determine if the amount of saturated fat exceeds 10 percent of that product's total calories per serving.

Now if you're already familiar with the Nutrition Facts labeling on food products, you may notice that we've left off the "% of Daily Value" column. There are two reasons for doing this.

First, not all food products have the Nutrition Facts label, so you need to know how to perform this calculation yourself. Secondly, and most importantly, you need to keep track of your total dietary intake of cholesterol and saturated fat. And the most accurate way to do so is not to add up the percentages, but the keep track of the total grams (g) or milligrams (mg) and convert that figure into a single percentage.

- Calculator
- Copy of checklist

TOOLS AND MATERIALS



OBJECTIVE 4 CHECKLIST:

Calculate dietary intake of cholesterol and saturated fat

Fast food cheeseburger

Serving size exceed

recommended cholesterol level? _____

What percentage of calories

came from saturated fat? _____

Does that amount exceed

recommended level? _____

Large french fries

Serving size exceed

recommended cholesterol level? _____

What percentage of calories

came from saturated fat? _____

Does that amount exceed

recommended level? _____

Fast food grilled chicken sandwich

Serving size exceed

recommended cholesterol level? _____

What percentage of calories

came from saturated fat? _____

Does that amount exceed

recommended level? _____

Breakfast sandwich with sausage & egg

Serving size exceed

recommended cholesterol level? _____

What percentage of calories

came from saturated fat? _____

Does that amount exceed

recommended level? _____

Two scrambled eggs

Serving size exceed

recommended cholesterol level? _____

What percentage of calories

came from saturated fat? _____

Does that amount exceed

recommended level? _____

Butter

Serving size exceed

recommended cholesterol level? _____

What percentage of calories

came from saturated fat? _____

Does that amount exceed

recommended level? _____

Wheat bread

Serving size exceed

recommended cholesterol level? _____

What percentage of calories

came from saturated fat? _____

Does that amount exceed

recommended level? _____

Margarine

Serving size exceed

recommended cholesterol level? _____

What percentage of calories

came from saturated fat? _____

Does that amount exceed

recommended level? _____

Tuna in spring water

Serving size exceed

recommended cholesterol level? _____

What percentage of calories

came from saturated fat? _____

Does that amount exceed

recommended level? _____

Grape jelly

Serving size exceed

recommended cholesterol level? _____

What percentage of calories

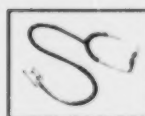
came from saturated fat? _____

Does that amount exceed

recommended level? _____

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 4 ACTIVITIES



Microwave chili

Serving size exceed
recommended cholesterol level? _____
What percentage of calories
came from saturated fat? _____
Does that amount exceed
recommended level? _____

Crunchy peanut butter

Serving size exceed
recommended cholesterol level? _____
What percentage of calories
came from saturated fat? _____
Does that amount exceed
recommended level? _____

Bologna

Serving size exceed
recommended cholesterol level? _____
What percentage of calories
came from saturated fat? _____
Does that amount exceed
recommended level? _____

Spaghetti sauce: Creamy Alfredo style

Serving size exceed
recommended cholesterol level? _____
What percentage of calories
came from saturated fat? _____
Does that amount exceed
recommended level? _____

Spaghetti sauce: Light tomato & herb

Serving size exceed
recommended cholesterol level? _____
What percentage of calories
came from saturated fat? _____
Does that amount exceed
recommended level? _____

Spaghetti

Serving size exceed
recommended cholesterol level? _____
What percentage of calories
came from saturated fat? _____
Does that amount exceed
recommended level? _____

Chunky clam chowder

Serving size exceed
recommended cholesterol level? _____
What percentage of calories
came from saturated fat? _____
Does that amount exceed
recommended level? _____

Whole milk

Serving size exceed
recommended cholesterol level? _____
What percentage of calories
came from saturated fat? _____
Does that amount exceed
recommended level? _____

Skim milk

Serving size exceed
recommended cholesterol level? _____
What percentage of calories
came from saturated fat? _____
Does that amount exceed
recommended level? _____

Tomato soup

Serving size exceed
recommended cholesterol level? _____
What percentage of calories
came from saturated fat? _____
Does that amount exceed
recommended level? _____

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 4 ACTIVITIES



Chocolate candy bar

Serving size exceed

recommended cholesterol level? _____

What percentage of calories

came from saturated fat? _____

Does that amount exceed

recommended level? _____

Sour cream & onion potato chips

Serving size exceed

recommended cholesterol level? _____

What percentage of calories

came from saturated fat? _____

Does that amount exceed

recommended level? _____

Microwave personal-size pizza

Serving size exceed

recommended cholesterol level? _____

What percentage of calories

came from saturated fat? _____

Does that amount exceed

recommended level? _____

Breakfast sausage links

Serving size exceed

recommended cholesterol level? _____

What percentage of calories

came from saturated fat? _____

Does that amount exceed

recommended level? _____

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TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 4 ACTIVITIES



PROCEDURE

Getting Ready

This example shows the type of calculations you need to before to complete this activity. If you have any questions after reviewing this example, ask your instructor for assistance.

Review the Nutrition Facts label in the figure box to the right. In this activity there are two things you need to determine for each label:

- Does the amount of cholesterol exceed the recommended daily limit?
- Does the amount of saturated fat exceed exceeds 10 percent of that product's total calories per serving?

To answer the first question, just compare the amount of cholesterol listed on the label and see if it exceeds 300 mg. Nearly all the labels you'll work with in this activity will not exceed 300 mg. However, as you look over these labels, think about your total dietary intake on a daily basis. That "lean/light" burger—without cheese—accounts for nearly one-third of the amount of cholesterol you should eat every day.

NOTE: Another thing to be aware of is the "Serving Size" and "Servings Per Container" information. Although you'll

light/lean fast food
burger without cheese

Nutrition Facts

Serving Size: 1 burger

Servings

Per Container: 1

Amount Per Serving

Calories 350

Calories from Fat 110

Total Fat 12g

Saturated Fat 4.5g

Polyunsaturated Fat -

Monounsaturated Fat -

Cholesterol 95 mg

Sodium 1160 mg

Total Carbohydrate 38g

Dietary Fiber 3g

Sugars 8g

Protein 4g

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 4 ACTIVITIES



only be calculating the amount of cholesterol and saturated fat in a single serving, you might want to think whether or not this represents what most people consider to be a typical portion.

To answer the second question, take the amount of saturated fat and multiply it by 9. (There are 9 calories in each gram of fat.)

- $4.5 \times 9 = 40.5$ calories from saturated fat.

Then divide your answer by the total number of calories and multiply by 100 to get a percentage.

- $40.5 \div 350 = 0.115$
- $0.115 \times 100 = 11.5\%$

This amount does slightly exceed the 10 percent recommended by the American Heart Association. Yet remember, that applies to your total dietary intake. The average person, depending on their health and lifestyle, should eat between 2,000 and 2,500 calories per day. So although this burger does have slightly more saturated fat than recommended, if you balance out what you eat for the rest of the day, you should be well within limits.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 4 ACTIVITIES



Calculating dietary intake of cholesterol and saturated fat

On the checklist, indicate for each of the
following foods:

- Whether or not the listed serving size exceeds the recommended daily amount of cholesterol
- What percentage of calories per serving come from saturated fat
- Does that amount exceed the recommended level of 10%

Fast food cheeseburger
with 0.25 lb meat patty

Nutrition Facts

Serving Size: 1 sandwich

Servings

Per Container: 1

Amount Per Serving

Calories 530

Calories from Fat 270

Total Fat 30g

Saturated Fat 13g

Polyunsaturated Fat -

Monounsaturated Fat -

Cholesterol 95 mg

Sodium 1160 mg

Total Carbohydrate 38g

Dietary Fiber 2g

Sugars 8g

Protein 28g

Fast food grilled
chicken sandwich

Nutrition Facts

Serving Size: 1 sandwich

Servings

Per Container: 1

Amount Per Serving

Calories 260

Calories from Fat 35

Total Fat 4g

Saturated Fat 1g

Polyunsaturated Fat -

Monounsaturated Fat -

Cholesterol 45mg

Sodium 500mg

Total Carbohydrate 33g

Dietary Fiber 2g

Sugars 6g

Protein 24g

Large french fries

Nutrition Facts

Serving Size: 1 carton

Servings

Per Container: 1

Amount Per Serving

Calories 540

Calories from Fat 230

Total Fat 26g

Saturated Fat 4.5g

Polyunsaturated Fat -

Monounsaturated Fat -

Cholesterol 0mg

Sodium 350mg

Total Carbohydrate 68g

Dietary Fiber 6g

Sugars 0g

Protein 8g

Breakfast sandwich
with sausage and egg

Nutrition Facts

Serving Size: 1 sandwich

Servings

Per Container: 1

Amount Per Serving

Calories 440

Calories from Fat 260

Total Fat 29g

Saturated Fat 10g

Polyunsaturated Fat -

Monounsaturated Fat -

Cholesterol 255mg

Sodium 820mg

Total Carbohydrate 27g

Dietary Fiber 1g

Sugars 3g

Protein 19g

Two scrambled eggs

Nutrition Facts	
Serving Size:	1 order
Servings	
Per Container:	1
Amount Per Serving	
Calories	170
Calories from Fat	110
Total Fat	12g
Saturated Fat	3.5g
Polyunsaturated Fat	-
Monounsaturated Fat	-
Cholesterol	425mg
Sodium	190mg
Total Carbohydrate	1g
Dietary Fiber	0g
Sugars	1g
Protein	13g

Wheat bread

Nutrition Facts	
Serving Size:	1 slice
Servings	
Per Container:	18
Amount Per Serving	
Calories	90
Calories from Fat	10
Total Fat	0g
Saturated Fat	-
Polyunsaturated Fat	-
Monounsaturated Fat	-
Cholesterol	0mg
Sodium	200mg
Total Carbohydrate	18g
Dietary Fiber	2g
Sugars	.3g
Protein	4g

Butter

Nutrition Facts	
Serving Size:	1 tbsp.
Servings	
Per Container:	32
Amount Per Serving	
Calories	100
Calories from Fat	100
Total Fat	11g
Saturated Fat	7g
Polyunsaturated Fat	-
Monounsaturated Fat	-
Cholesterol	30mg
Sodium	90mg
Total Carbohydrate	0g
Dietary Fiber	
Sugars	
Protein	0g

Margarine

Nutrition Facts	
Serving Size:	1 tbsp.
Servings	
Per Container:	32
Amount Per Serving	
Calories	100
Calories from Fat	100
Total Fat	11g
Saturated Fat	2.5g
Polyunsaturated Fat	2.5g
Monounsaturated Fat	2.5g
Cholesterol	0mg
Sodium	110mg
Total Carbohydrate	0g
Dietary Fiber	
Sugars	
Protein	0g

Tuna in spring water

Nutrition Facts	
Serving Size:	2 oz.
Servings	
Per Container:	2.5
Amount Per Serving	
Calories	60
Calories from Fat	5
Total Fat	0.5g
Saturated Fat	0g
Polyunsaturated Fat	-
Monounsaturated Fat	-
Cholesterol	30mg
Sodium	250mg
Total Carbohydrate	0g
Dietary Fiber	0g
Sugars	0g
Protein	13g

Microwave chili

Nutrition Facts	
Serving Size:	1 cup
Servings	
Per Container:	1
Amount Per Serving	
Calories	250
Calories from Fat	100
Total Fat	11g
Saturated Fat	5g
Polyunsaturated Fat	-
Monounsaturated Fat	-
Cholesterol	50mg
Sodium	980mg
Total Carbohydrate	23g
Dietary Fiber	6g
Sugars	2g
Protein	15g

Grape jelly

Nutrition Facts	
Serving Size:	1 tbsp
Servings	
Per Container:	26
Amount Per Serving	
Calories	50
Calories from Fat	0
Total Fat	0g
Saturated Fat	0g
Polyunsaturated Fat	-
Monounsaturated Fat	-
Cholesterol	0mg
Sodium	10mg
Total Carbohydrate	13mg
Dietary Fiber	-
Sugars	13g
Protein	0g

Crunchy peanut butter

Nutrition Facts	
Serving Size:	2 tbsp.
Servings	
Per Container:	16
Amount Per Serving	
Calories	200
Calories from Fat	140
Total Fat	17g
Saturated Fat	2.5g
Polyunsaturated Fat	-
Monounsaturated Fat	-
Cholesterol	0mg
Sodium	10mg
Total Carbohydrate	6g
Dietary Fiber	2g
Sugars	1g
Protein	8g

Bologna

Nutrition Facts

Serving Size: 1 slice

Servings

Per Container: 16

Amount Per Serving

Calories 90

Calories from Fat 70

Total Fat 8g

Saturated Fat 3g

Polyunsaturated Fat -

Monounsaturated Fat -

Cholesterol 20mg

Sodium 250mg

Total Carbohydrate 1g

Dietary Fiber 0g

Sugars 18g

Protein 3g

Spaghetti

Nutrition Facts

Serving Size: 2 oz.

Servings

Per Container: 12

Amount Per Serving

Calories 210

Calories from Fat 10

Total Fat 18g

Saturated Fat 0g

Polyunsaturated Fat -

Monounsaturated Fat -

Cholesterol 0mg

Sodium 0mg

Total Carbohydrate 40g

Dietary Fiber 2g

Sugars 2g

Protein 9g

Spaghetti sauce:
Creamy Alfredo style

Nutrition Facts

Serving Size: 1/4 cup

Servings

Per Container: 8

Amount Per Serving

Calories 160

Calories from Fat 130

Total Fat 14g

Saturated Fat 3g

Polyunsaturated Fat -

Monounsaturated Fat -

Cholesterol 5mg

Sodium 310mg

Total Carbohydrate 4g

Dietary Fiber 0g

Sugars 2g

Protein 5g

Spaghetti sauce:
Light tomato & herb

Nutrition Facts

Serving Size: 1/2 cup

Servings

Per Container: 6

Amount Per Serving

Calories 50

Calories from Fat 0

Total Fat 0g

Saturated Fat 0g

Polyunsaturated Fat -

Monounsaturated Fat -

Cholesterol 0mg

Sodium 390mg

Total Carbohydrate 11g

Dietary Fiber 2g

Sugars 9g

Protein 2g

Chunky clam chowder

Nutrition Facts

Serving Size: 1 can

Servings

Per Container: 1

Amount Per Serving

Calories 300

Calories from Fat 160

Total Fat 18g

Saturated Fat 7g

Polyunsaturated Fat -

Monounsaturated Fat -

Cholesterol 15mg

Sodium 1,210mg

Total Carbohydrate 26g

Dietary Fiber 3g

Sugars 1g

Protein 9g

Tomato soup

Nutrition Facts

Serving Size: 1/2 cup

Servings

Per Container: 2.5

Amount Per Serving

Calories 100

Calories from Fat 20

Total Fat 2g

Saturated Fat 0g

Polyunsaturated Fat -

Monounsaturated Fat -

Cholesterol 0mg

Sodium 730mg

Total Carbohydrate 18g

Dietary Fiber 2g

Sugars 10g

Protein 2g

Whole milk

Nutrition Facts

Serving Size: 1 cup

Servings

Per Container: 16

Amount Per Serving

Calories 150

Calories from Fat 70

Total Fat 8g

Saturated Fat 5g

Polyunsaturated Fat -

Monounsaturated Fat -

Cholesterol 35mg

Sodium 130mg

Total Carbohydrate 12g

Dietary Fiber 0g

Sugars 12g

Protein 8g

Skim milk

Nutrition Facts

Serving Size: 1 cup

Servings

Per Container: 16

Amount Per Serving

Calories 90

Calories from Fat 0

Total Fat 0g

Saturated Fat 0g

Polyunsaturated Fat -

Monounsaturated Fat -

Cholesterol 5mg

Sodium 135mg

Total Carbohydrate 13g

Dietary Fiber 0g

Sugars 12g

Protein 9g

Chocolate candy bar

Nutrition Facts

Serving Size: 1 bar

Servings

Per Container: 1

Amount Per Serving

Calories 230

Calories from Fat 120

Total Fat 13g

Saturated Fat 9g

Polyunsaturated Fat -

Monounsaturated Fat -

Cholesterol 10mg

Sodium 40mg

Total Carbohydrate 25g

Dietary Fiber 1g

Sugars 22g

Protein 3g

*Microwave
personal-size pizza*

Nutrition Facts

Serving Size: 1 pizza

Servings

Per Container: 1

Amount Per Serving

Calories 550

Calories from Fat 290

Total Fat 32g

Saturated Fat 14g

Polyunsaturated Fat -

Monounsaturated Fat -

Cholesterol 55mg

Sodium 1160mg

Total Carbohydrate 41g

Dietary Fiber 3g

Sugars 8g

Protein 25g

*Sour cream & onion
potato chips*

Nutrition Facts

Serving Size: 1 bag

Servings

Per Container: 1

Amount Per Serving

Calories 150

Calories from Fat 90

Total Fat 9g

Saturated Fat 2.5g

Polyunsaturated Fat -

Monounsaturated Fat -

Cholesterol 0mg

Sodium 180mg

Total Carbohydrate 15g

Dietary Fiber 1g

Sugars 1g

Protein 2g

Breakfast sausage links

Nutrition Facts

Serving Size: 3 links

Servings

Per Container: 3

Amount Per Serving

Calories 120

Calories from Fat 80

Total Fat 9g

Saturated Fat 2.5g

Polyunsaturated Fat -

Monounsaturated Fat -

Cholesterol 55mg

Sodium 280mg

Total Carbohydrate 1g

Dietary Fiber 0g

Sugars 0g

Protein 10g

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 4 ACTIVITIES



If you finish day four with time left over you can choose from the following:

- Review the different food products and assemble a well balanced nutritional menu for a single meal. Be sure to list:
 - Each item that you will use
 - How many servings you plan to eat
 - The total amount of cholesterol of all of the items, multiplied by the servings
 - The total amount of saturated fat grams, multiplied by servings; then perform the fat gram/calorie/ percentage calculation for that total.
- Ask if your instructor has any nutritional software you can use on the computer. If so, you may be able to:
 - Input items off the school lunch menu and form a well-balanced meal
 - Use recepies that may have come with the software to form a well-balanced meal

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

On Day 5 you should complete the following activities:

- ① Read Information Sheet
- ② Complete Objective 5
- ③ Read Information Sheet
- ④ Complete Objective 6

DAY 5 ACTIVITIES

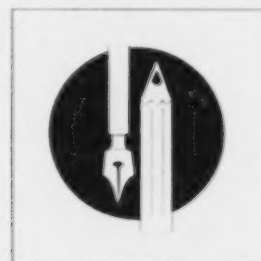


SUMMARY OF ACTIVITIES



Reading Comprehension

- Gain factual information



Functional Writing

- Complete forms and records



Life Science

- Investigate/apply principles of anatomy/physiology

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 5 ACTIVITIES



Job Acquisition/Development

- Master specific job task / procedure

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 5 ACTIVITIES

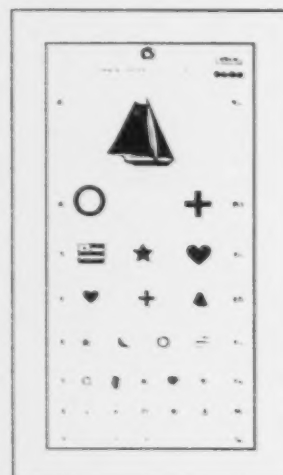
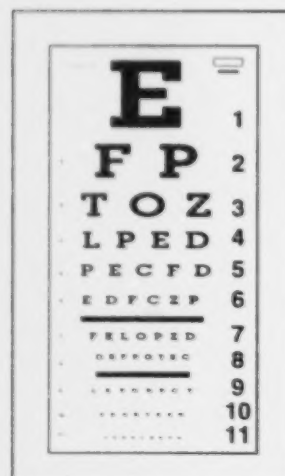


INFORMATION SHEET

Simple visions tests are both easy to perform and a good indicator if further examination is necessary. The most basic test involves using a standard eye chart, often referred to as the Snellen eye chart.

The Snellen chart has a series of rows. In each row, there are letters of the alphabet. The letters in each row get smaller as you read down the chart.

That chart, however, can't be used with children who don't yet know the alphabet. In these instances, a variation of the Snellen chart which substitutes pictures for letters can be used.



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 5 ACTIVITIES



Another type of chart may be needed when examining persons who are not familiar with the English language. This chart uses the capital letter "E" throughout instead of different letters. In each row of this chart, every "E" is positioned differently. Patients using this chart are asked to state in which direction the individual E's are pointing.

To test how well a person sees up close, examiners give the patient a sheet of paper to read from. This is often a pre-printed page that is the opposite of the Snellen chart. The lines at the top of this page are of the smallest; the lines at the bottom are the largest.



What Simple Eye Tests Reveal

Results from eye tests like those we've just discussed can indicate the following conditions:

- **Myopia** - This is often referred to as nearsightedness. It means a person has trouble seeing things at a distance.
- **Hyperopia** - This is the reverse of myopia and often called farsightedness. It means a person has trouble seeing things up close.
- **Astigmatism** - This refers to a blurring of vision due to irregularities within the eye.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 5 ACTIVITIES



Visual Acuity

Visual acuity refers to how well a person can see. It is usually expressed as a fraction. 20/20 vision means a person has normal vision. People with 20/20 vision are able to clearly see what an average person can see at a distance of 20 feet.

When the second number is higher than 20, such as when someone has 20/60 vision, that means a person has trouble seeing things that are far away. In this example, the person would need to be 20 feet away from an object in order to see it as clearly as an average person could from a distance of 60 feet.

If the second number is lower than 20, then that person has above-average vision. Someone with 20/10 vision can clearly see at 20 feet what the average person could only see at 10 feet.

Other Eye Tests

While using a Snellen chart is a good way to test simple vision, other more sophisticated tests are a necessary part of a thorough eye examination. Here are just a few examples of what an ophthalmologist—a medical doctor who specializes in the eye—may do when you have your eyes examined.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 5 ACTIVITIES



- Funduscopy examination - In this procedure, the doctor uses a special instrument called an ophthalmoscope to look at the interior of your eye.

Specifically, the doctor will examine the retina, which is the inside layer of the eyeball.

- Tonometry - This procedure is used to measure the pressure within the eye. Pressure higher than normal can be a sign of glaucoma, a condition which often leads to some loss of vision or blindness. Although glaucoma cannot be cured, it can be treated and further deterioration of vision prevented.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

Evaluate vision.

While there are many sophisticated pieces of equipment used to test vision, a simple visual screening using the Snellen eye chart is a good beginning. This test provides a strong indication if further examination is needed.

- Newspaper or magazine
- Snellen eye chart
- A card or similar item that can be used to cover an eye
- Measuring tape, ruler, yardstick, or similar device
- Copy of checklist

DAY 5 ACTIVITIES



OBJECTIVE 5

INTRODUCTION

TOOLS AND MATERIALS



OBJECTIVE 5 CHECKLIST:

Evaluate vision

What was the patient's ability to read at close range? _____
(good, fair, poor)

What was the patient's visual acuity for the left eye? _____

What was the patient's visual acuity for the right eye? _____

What was the patient's visual acuity for both eyes? _____

Was there any difficulty in completing the examination? _____

Were any visual complaints expressed by the patient? _____

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

Getting Ready

Gather all of the necessary equipment and supplies. If you are working with a partner, you can assess each other's vision. If you do not have a partner, ask if you can assess your instructor's vision or if your instructor can request another student to help you.

- STEP 1:** Obtain all of the necessary equipment noted above.
- STEP 2:** Place the eye chart on a wall in a well-lighted area. Be sure there is 20 feet from the wall to the point where the patient will be positioned for testing. The chart should be placed on the wall at eye level.
- STEP 3:** Explain to the patient that this procedure is designed to test vision.
- STEP 4:** Determine whether the patient wears corrective lenses. If so, they should be worn during this test.

NOTE: Sometimes testing is done without corrective lenses. If you have time left over, you may wish to do this test without wearing corrective lenses.

DAY 5 ACTIVITIES



PROCEDURE

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 5 ACTIVITIES



Evaluating Vision

- STEP 5:** To test near vision, provide the patient with a magazine or newspaper. Make sure it is held 14 inches from the patient's eyes. Ask the patient to read the material aloud.
- STEP 6:** Position the patient 20 feet from the eye chart.
- STEP 7:** Give the patient a card or similar item that can be used to cover one's eye.
- STEP 8:** Have the patient cover the right eye and read letters on the lowest line of the chart that can be seen clearly. If the patient reads that line correctly, proceed to next line below. If the patient does not read the line correctly, proceed to line above.
- STEP 9:** Note the visual acuity as indicated by the numbers at the end of the lowest line that the patient accurately reads.

NOTE: This is expressed as a fraction with the top number being 20. (This indicates the patient was tested at 20 feet.) The bottom number of the fraction indicates the distance at which that line should be seen.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 5 ACTIVITIES



STEP 10: Repeat steps 8 and 9 with the left eye and note the visual acuity.

STEP 11: Repeat steps 8 and 9 with the patient having both eyes uncovered.

Evaluating/Documenting Visual Acuity

STEP 12: Answer the following questions regarding the patient's visual acuity. Record your answers on the checklist.

- a. What was the patient's ability to read at close range?
- b. What was the patient's visual acuity of each eye and for both eyes? (20/20, 20/40, etc.)
- c. Was there any difficulty in completing the examination?
- d. Were any visual complaints expressed by the patient?

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

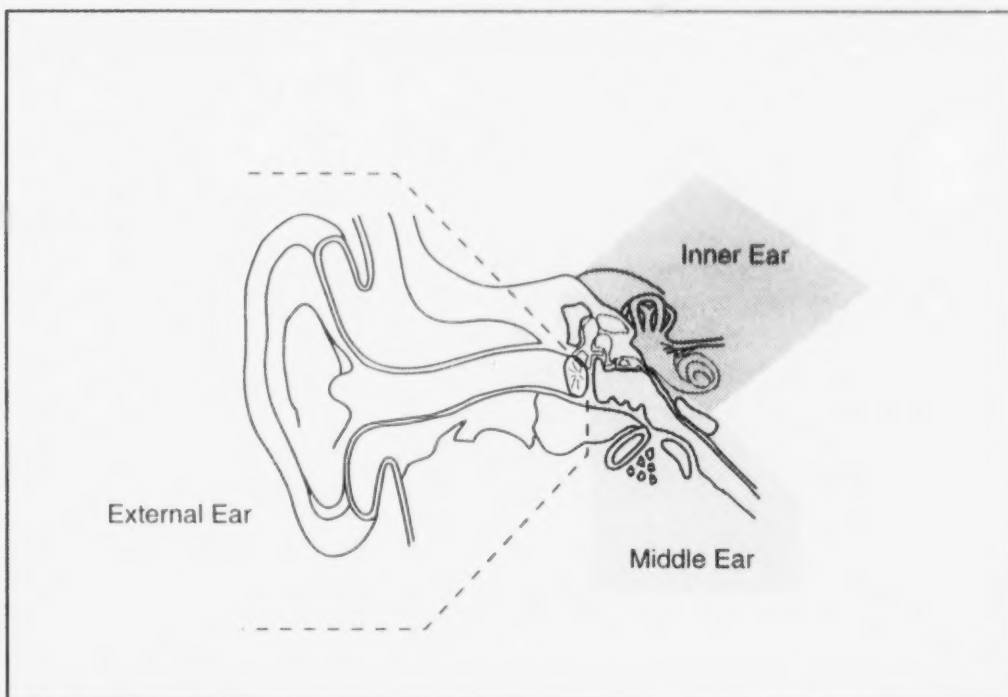
DAY 5
ACTIVITIES



INFORMATION SHEET

The ear can be divided into three parts:

- **External ear** - This includes the part of the ear which is visible to the eye, the ear canal, and the eardrum.
- **Middle ear** - In the middle ear, there are a small set of bones. When sound waves hit the eardrum, these bones strike each other and press against the inner ear.
- **Internal ear** - Vibrations from the bones in the middle ear are transmitted to the brain through nerves contained in the inner ear.



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 5 ACTIVITIES



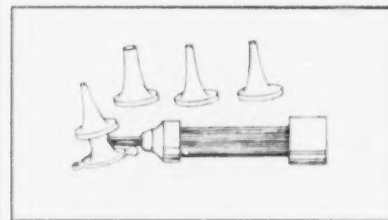
There are several types of tests that can be done to evaluate hearing. Some of the simplest tests involve using a tuning fork. Tests with done with a tuning fork, like those you'll be performing shortly, can help distinguish between two types of hearing loss:

- Conductive hearing loss - Occurs when there is a problem with the external or middle ear. Blockage of the ear canal or a broken eardrum are common examples of conductive hearing loss.

NOTE: *Blockage of the ear canal may be detected with an otoscope*

- Sensorineural hearing loss - Occurs when there is a problem with the internal ear.

If hearing loss is suspected, further examination of the ear may be done with an audiometer. This instrument emits sounds at different pitches or frequencies that the average person should be able to hear under normal conditions. Results from testing done with an audiometer help determine the range of hearing loss.



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

Evaluate hearing.

The following are some very simple hearing tests. These can be used to determine if more extensive testing is needed. Also be aware that the patient's response to your spoken word is another way to evaluate hearing.

- Ticking watch
- Tuning fork
- Copy of checksheet

**DAY 5
ACTIVITIES**



OBJECTIVE 6

INTRODUCTION

TOOLS AND MATERIALS



**OBJECTIVE 6 CHECKLIST:
Evaluate hearing**

Was the patient able to follow directions during the screening? _____

Was the patient able to identify numbers
and the sound of ticking in the left ear? _____

Was the patient able to identify numbers
and the sound of ticking in the right ear? _____

Was the patient able to identify sound as
equal in both ears for the Weber's test? _____

Was the patient able to hear sound
through the air after no longer hearing sound
by conduction for Rinne's test in the left ear? _____

Was the patient able to hear sound
through the air after no longer hearing sound
by conduction for Rinne's test in the right ear? _____

Did you have any difficulty in conducting the screening? _____

Was there any difficulty reported by the patient? _____

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

Getting Ready

Gather all of the necessary equipment and supplies. If you are working with a partner, you can assess each other's hearing. If you do not have a partner, ask if you can assess your instructor's hearing or if your instructor can request another student to help you.

- STEP 1: Obtain all of the necessary equipment noted above.
- STEP 2: Provide a quiet environment for testing.
- STEP 3: Explain the procedure to the patient.
- STEP 4: Note the patient's ability to respond to and follow instructions. This may indicate that the instructions are not heard.
- STEP 5: Assess the patient's speech patterns.
- NOTE:** *Talking loudly, speaking in a monotone, or mispronouncing words may indicate difficulty in hearing.*
- STEP 6: Ask if the patient has a history of ear infections.

DAY 5 ACTIVITIES



PROCEDURE

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 5 ACTIVITIES



STEP 7: Ask if the patient has been subjected to loud noises over a period of time.

Assessing The Patient's Hearing

STEP 8: Have the patient shut one ear with a finger and close eyes.

STEP 9: Stand one foot from the patient.

STEP 10: Whisper several numbers in random sequence.

STEP 11: Have the patient repeat the numbers.

STEP 12: Repeats steps 10 and 11 until the patient can identify half of the numbers.

STEP 13: Hold a ticking watch 1-2 inches from the closed ear.

STEP 14: Ask the patient if ticking is heard.

NOTE: *Ticking represents a higher frequency than the human voice.*

STEP 15: Repeat steps 8 - 14 for the other ear.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 5 ACTIVITIES



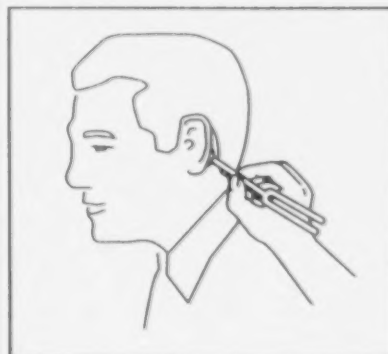
STEP 16: Hold the tuning fork at the base and activate it by striking it against the palm of your opposite hand.

STEP 17: Place the base of the vibrating fork against the top of the patient's head and ask the patient to identify where the sound is heard.

NOTE: *This is called Weber's test. Normally, the patient will identify the sound as being heard equally in both ears or at the top of the head.*

STEP 18: Hold the tuning fork at the base and activate it by striking it against the palm of your opposite hand.

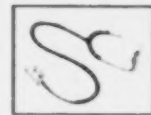
STEP 19: Place the base of the vibrating fork against the mastoid bone until the patient no longer hears sound.



STEP 20: Immediately place the prongs near the ear and ask the patient if the sound is still audible.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 5 ACTIVITIES



STEP 21: Repeat steps 16 - 20 for the other ear.

NOTE: *This is called Rinne's test. Sound is normally heard longer through air than by bone conduction.*

Evaluating/Documenting Hearing

STEP 22: Answer the following questions regarding the patient's hearing. Record your answers on the checksheet.

- a. Was the patient able to follow directions during the screening?
- b. Was the patient able to identify numbers and the sound of ticking in each ear?
- c. Was the patient able to identify sound as equal in both ears for the Weber's test?
- d. Was the patient able to hear sound through the air after no longer hearing sound by conduction for Rinne's test in each ear?
- e. Did you have any difficulty in conducting the screening?

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 5 ACTIVITIES



- f. Was there any difficulty reported by the patient?

If you finish day five with time left over, ask your instructor for permission to assess the eyes and ears of other students. At the end of the period, be sure all of the equipment and supplies you have used are properly stored.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

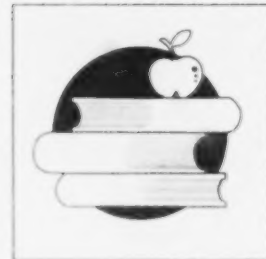
On Day 6 you should complete the following activities:

- 1 Complete Objective 7

DAY 6 ACTIVITIES



SUMMARY OF ACTIVITIES

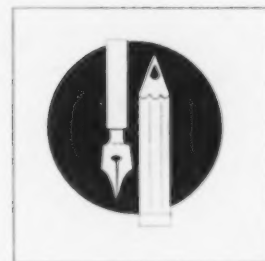


Reading Comprehension

- Gain factual information

Research and Reference

- Use standard references



Language

- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition

- Compose reports

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

Use professional reference materials to research and report on diagnostic tests

The diagnostic tools of health care professionals take a variety of forms. You've already used a few of the more basic ones. Now you are going to read about some others. And by doing so, you'll also learn how to use yet another tool.

While health care professionals of all types are expected to know a wealth of information, they also know how to use reference materials to research what they don't know.

For every specialty in health care there are a variety of materials. The one you'll use today can be found in college classes and in medical offices. The language is complex and at times will no doubt seem foreign. That's why you'll also be given a medical dictionary and illustrated guide to anatomy.

You are not expected to understand everything you read in these books. Yet with some concentration and effort, you will be able to glean enough information to complete this activity.

The purpose of introducing you to these materials is not to confuse you, but rather to open your eyes. If you are at all interested in a career in health care, then pay close attention and start to think about what type of classes you need to take in the next few years to help prepare you for this field.

DAY 6 ACTIVITIES



OBJECTIVE 7

INTRODUCTION

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

- Reference book on diagnostic procedures
- Dictionary of medical terms
- Illustrated guide to anatomy
- Pen and paper

Getting Ready

Gather together all of the reference materials and find a quiet place where you will be able to read and write. Because this material is complex, you might want to review the different assignments you're expected to complete and budget your time accordingly.

Learning How To Use Reference Materials

The reference book on diagnostics you have been provided with should be divided into sections on different body systems and/or different types of diagnostic procedures. Check the table of contents and also thumb through the book to see how it is arranged.

Within each of these sections there should be several types of procedures listed. The information for each procedure is typically divided into:

- The purpose of the procedure
- How to prepare the patient

DAY 6 ACTIVITIES



TOOLS AND MATERIALS

PROCEDURE

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 6 ACTIVITIES



- How to perform the procedure
- Precautions to take when performing the procedure
- A description of the findings one can expect to encounter when performing the procedure and the implications of those findings

Each procedure may not have every section. For some there may be more, for others there may be less. This depends on both the procedure and the publisher.

STEP 1: Once you have a basic understanding of how your book is arranged, provide a brief written answer to one of the following:

- If the book is divided into both test types and body systems, research and write down the names of two types of blood tests and two tests that can be performed on the skeletal system.
- If the book is only divided into test types, research and write down the names of four blood tests.

TECHNOLOGY EDUCATION DIAGONSTIC CARE: GRADE 9

DAY 6 ACTIVITIES



- If the book is only divided into body systems, research and write down the names of four tests that can be performed on the skeletal system.

Now, using either the table of contents or index, find the area in your reference book that covers a procedure call bronchoscopy. Once you have found the section covering this procedure, write a brief response to each of the following questions.

Note: *If you have trouble understanding some of the terminology in the diagnostic reference book, see if they are explained in the medical dictionary or pictured in the illustrated guide to anatomy.*

- STEP 2:** What are two purposes for performing a bronchoscopy?
- STEP 3:** How long should a patient fast (not eat anything) before a bronchoscopy is performed?
- STEP 4:** Aside from monitoring vital signs, what is one other type of post-test care that should be provided?

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 6 ACTIVITIES



Reporting On A Diagnostic Test

Now you have an opportunity to research and report on a diagnostic test of your own choice. Think back over the last few days. Which of the procedures that you performed did you find most interesting.

If, for example, you enjoyed experimenting with sound and learning about the ear, then you might want to research and write about otoscopy. On the other hand, if you liked performing the eye test, then you might want to review a procedure called tonometry.

No matter what type of diagnostic test you select, you are asked to describe in your own words:

STEP 5: What the test/procedure involves and its purpose. (One paragraph)

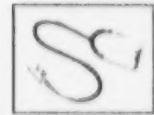
Example: The Weber tuning fork test involves striking and then placing a low frequency tuning fork on the crown of a patient's head... The purpose of the Weber test is to determine if the patient has hearing loss...

STEP 6: How the procedure is performed. (Two to three paragraphs)

STEP 7: Typical precautions to take. (One paragraph)

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 6 ACTIVITIES



STEP 8: What findings one can expect from the procedure and what are the implications of those results?
(One to two paragraphs)

If you finish day six with time left over, then find the section in the diagnostic reference book that covers how to measure blood pressure with a sphygmomanometer. You will get to perform this procedure tomorrow. If you run out of time before completing this assignment, then save what you have written and complete this assignment after taking the posttest.

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TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

On Day 7 you should complete the following activities:

- ① Read Information Sheet
- ② Complete Objective 8.

DAY 7 ACTIVITIES

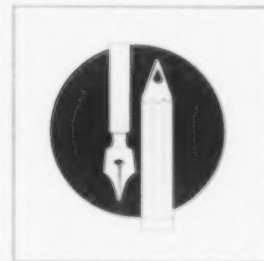


SUMMARY OF ACTIVITIES



Reading Comprehension

- Gain factual information



Functional Writing

- Complete forms and records



Operation and Calculation

- Calculate with whole numbers

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 7 ACTIVITIES



Life Science

- Investigate/apply principles of anatomy/physiology



Job Acquisition/Development

- Master specific job task / procedure

TECHNOLOGY EDUCATION DIAGONSTIC CARE: GRADE 9

Blood pressure measures the pressure of blood against the walls of the arteries.

Blood pressure is expressed as two numbers. The reading 120/80 is considered an average adult reading. The upper number, 120, is the systolic reading. This is an indication of the pressure present when the heart contracts to force blood into the arteries. The lower number, 80, is the diastolic reading which represents the pressure present when the heart relaxes.

The difference between the two readings is called the pulse pressure. The average adult reading of 120/80 would have a pulse pressure of 40. A pulse pressure of 30-50 is considered normal.

A wide range of blood pressure readings is considered normal. Adult systolic readings could vary from 100 - 140. Diastolic readings from 60-90 are also considered to be within the normal range. Blood pressure higher than normal ranges is called hypertension. Blood pressure below normal ranges is called hypotension.

What Blood Pressure Readings Tell Us

Blood pressure readings provide us with information about the state of the (cardiovascular) system.

The systolic reading tells us about the heart's ability to function as a pump. When exercising, the heart pumps harder. Therefore you would expect a higher than normal systolic reading. A fever may also cause a higher reading.

DAY 7 ACTIVITIES



INFORMATION SHEET

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 7 ACTIVITIES



The diastolic reading helps us determine how well the blood is flowing through the veins. A higher than normal diastolic reading may be a sign of blood vessels that have narrowed or that have lost their elasticity.

A drop in blood pressure may be an indication that the amount of blood circulating in the body is lower than normal. The reverse is also true. An increase in blood volume will be reflecting by an increase in blood pressure. This makes blood pressure an important assessment factor in shock and fluid overload.

Factors That Influence Blood Pressure:

Blood pressure varies with age. Average readings for various ages are listed below. Keep in mind that the normal range on either side of these numbers is fairly broad.

Newborn	78/42
1 year	95/65
6-9 years	100/65
10-13 years	110/65
18+ years	120/80

TECHNOLOGY EDUCATION DIAGONSTIC CARE: GRADE 9

DAY 7 ACTIVITIES

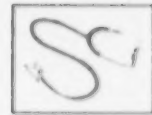


Other factors causing changes in blood pressure include:

- Exercise - This increases blood pressure. Like pulse rates, however, regular aerobic exercise can have the effect of lowering blood pressure.
- Time of day - This may play a part in readings. The lowest blood pressure readings could be expected in the day and should rise during the day.
- Sex - Females have a lower blood pressure on the average.
- Stress, anxiety, fear, and pain - All of these factors can raise blood pressure.
- Medications - There are medications available that can either raise or lower blood pressure. Other medications influence blood pressure as a side-effect. Sinus medications, steroids, and birth control pills tend to raise blood pressure. So do caffeine and nicotine.
- Race - This has been found to have some effect on blood pressure. A higher percentage of African-Americans, and particularly African-American males, have hypertension.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

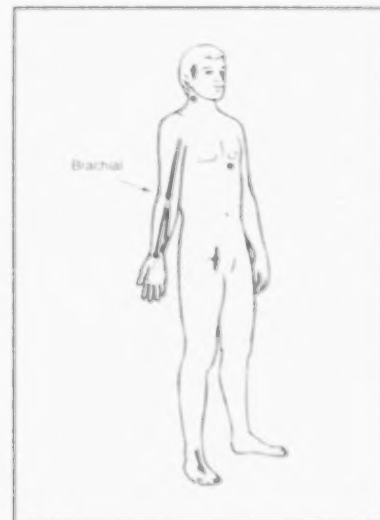
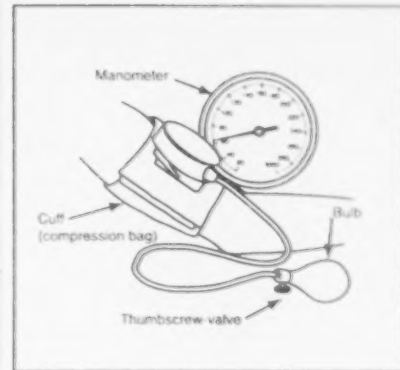
DAY 7 ACTIVITIES



How Blood Pressure Is Measured

Blood pressure is measured using a stethoscope and an instrument called a sphygmomanometer. A cuff with a rubber balloon or "bladder" is attached to the sphygmomanometer. There are many different types of sphygmomanometers available including mercury, aneroid, and electronic. Chances are you'll be using an aneroid sphygmomanometer.

The cuff is usually placed around the upper arm, although it can also be placed around the upper or lower leg. The bladder inside the cuff is then inflated to restrict the flow of blood through an artery. Next, the stethoscope is placed over an artery. The brachial artery is used when the cuff is placed around the upper arm.



As the cuff is deflated, you listen with the stethoscope for sounds indicating the return flow of blood through the artery. At the same time, you watch the gage on the sphygmomanometer. The points on the gage where the sounds begin and end determine the blood pressure reading.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

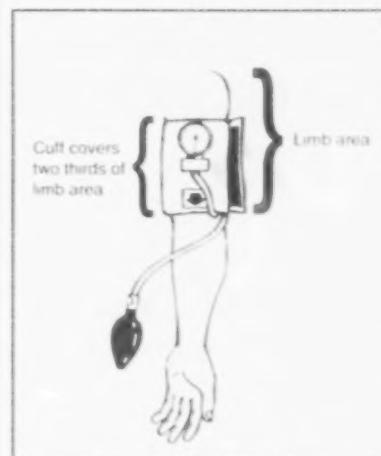
DAY 7 ACTIVITIES



The sounds you'll hear are called Korotkoff sounds. The first sound heard determines the systolic reading. The sounds start faintly, increase in volume, and then diminish. The point where the sounds may no longer be heard is the diastolic reading.

In some individuals, there is a distinct muffling of sound and then more beats before the sound may no longer be heard. In this case, all three numbers may be recorded. The muffled sound is called the first diastolic reading. The point where sound ends is called the second diastolic reading.

One important factor in measuring blood pressure is to make sure you are using the right cuff size. A quick way of assessing cuff size is to determine whether 2/3 of the limb area used (such as the upper arm) is covered by the cuff.



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 7 ACTIVITIES



Correct bladder size is also an important consideration. The width of the bladder should cover about 40% of the circumference of the limb. The length of the bladder should also be twice the measurement of the bladder's width.

If the cuff used is too large, the reading obtained will be too low. If the cuff is too small, the reading will be too high. It is important to use the correct size and to use the same cuff each time reading are compared.



TECHNOLOGY EDUCATION DIAGONSTIC CARE: GRADE 9

Obtain blood pressure reading.

Assessing blood pressure is a complex technique to master. It is also an important technique to master since accurate blood pressure readings are essential in assessing someone's vital signs.

Learning how to use this equipment may take time. Do not be discouraged if you need several attempts before you can obtain accurate results. Be sure to read over all of the steps before performing the procedure.

- Sphygmomanometer (mercury, aneroid, or electronic)

NOTE: *Exact instructions for electronic models will vary. Be sure to consult the manufacturer's instructions for alterations in technique.*

- Stethoscope

NOTE: *Electronic sphygmomanometers do not require stethoscopes.*

- Alcohol swabs
- Copy of checklist

DAY 7
ACTIVITIES



OBJECTIVE 8

INTRODUCTION

TOOLS AND MATERIALS

**TECHNOLOGY EDUCATION
DIAGNOSTIC CARE: GRADE 9**

**DAY 7
ACTIVITIES**



**OBJECTIVE 8 CHECKLIST:
Obtain blood pressure reading**

What was the patient's systolic reading? _____

What was the patient's diastolic reading? _____

Is the patient's blood pressure within normal limits for age? _____



May be photocopied for student use.

Technology Education - Diagnostic Care
TE3208 - page 136

TECHNOLOGY EDUCATION DIAGONSTIC CARE: GRADE 9

Getting Ready

Gather all of the necessary equipment and supplies. If you are working with a partner, you can assess each other's blood pressure. If you do not have a partner, ask if you can assess your instructor's blood pressure or if your instructor can request another student to help you.

- STEP 1: Clean the earpieces and diaphragm of the stethoscope with alcohol swabs.
- STEP 2: Explain the procedure to the patient. Be sure to ask the patient about any recent activity that could alter the reading (recent strenuous activity, consuming caffeine, etc.).
- STEP 3: Note any complaints from the patient that might indicate change in blood pressure reading, such as weakness, dizziness, headache, or blurred vision.

IMPORTANT! *Do not obtain perform this procedure on someone whose arm is or has recently been bruised or injured in any way.*

DAY 7 ACTIVITIES



PROCEDURE



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TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 7 ACTIVITIES



STEP 4: Check to make sure the cuff is the appropriate size.

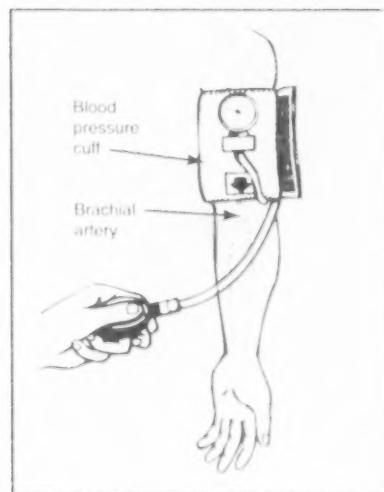
STEP 5: If the patient's arm is covered with a sleeve, ask the patient to loosely roll up the sleeve.

NOTE: *Sleeves which are tightly rolled up might cause a constriction of blood flow and influence the outcome of the procedure.*

Assessing The Patient's Blood Pressure

STEP 6: Place the patient's arm at heart level. Be sure the palm is facing upward and the forearm well-supported.

STEP 7: Place deflated cuff securely around the arm. The lower edge of the cuff should be 1 inch above the brachial artery.



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 7 ACTIVITIES



- STEP 8:** Position the sphygmomanometer's gauge so it is easy for you to see.
- STEP 9:** Hold the sphygmomanometer's bulb in one hand and close the thumb screw.
- STEP 10:** Place the fingers of your other hand over the brachial artery. You should be able to feel the patient's pulse. Be sure your fingers are placed toward the "little finger side" of the patient's arm.
- STEP 11:** Begin to inflate the cuff. Keep your eye's on the gage while feeling the patient's pulse. Once the brachial pulse disappears, note the reading on the gage. Continue to inflate the cuff until it is 30 mm Hg above the point where the pulse disappeared.

NOTE: *In some individuals, it is very difficult to feel the pulse at the brachial artery while inflating the cuff. In these instances, you will need to measure the blood pressure of someone else.*

- STEP 12:** Once the gauge is 30 mm Hg above the point where the pulse disappeared, immediately position the diaphragm of the stethoscope over the brachial artery and hold it in place.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 7 ACTIVITIES



STEP 13: While listening with the stethoscope, open the thumb screw and slowly deflate the cuff at a rate of 2-3 mm Hg per second.

STEP 14: Note the reading on the gage when you first begin to hear the Korotkoff sounds. This is the systolic reading.

STEP 15: Continue listening and allowing the cuff to deflate. When the sounds are no longer heard, note the reading on the gauge. This is the diastolic reading.

STEP 16: Open the thumb screw completely and allow the cuff to deflate.

NOTE: *If you had difficulty in obtaining a reading, wait 1 or 2 minutes before reassessing to allow circulation to be reestablished.*

STEP 17: Remove the cuff and lower the patient's arm.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 7 ACTIVITIES



Evaluating/Documenting Blood Pressure

STEP 18 Answer the following questions regarding the patient's blood pressure. Record your answers on your checklist.

- a. What was the patient's systolic reading?
- b. What was the patient's diastolic reading?
- c. Is the patient's blood pressure within normal limits for age?

If you finish day seven with time left over, ask your instructor for permission to assess the blood pressure of other students or check the blood pressure of your patient in different positions—standing, sitting, laying down—and note if there is any difference. At the end of the period, be sure all of the equipment and supplies you have used are properly stored.

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

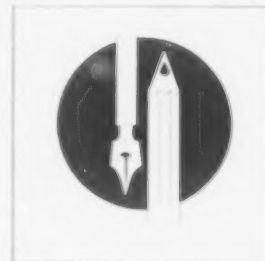
On Day 8 you should complete the following activities:

- ① Read Impact Statements
- ② Complete Career Search Activity
- ③ Complete any unfinished assignments
- ④ Complete Posttest

DAY 8 ACTIVITIES



SUMMARY OF ACTIVITIES



Language

- Use standard grammar, spelling, and capitalization
- State ideas clearly



Job Search/ Selection

- Analyze personal occupational aptitudes/preferences
- Investigate employment prospects of a career field/occupation
- Investigate training requirements for a career field/occupation
- Investigate benefits of a career field/occupation

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TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

Health care practitioners including diagnosticians, play an important role in improving our environment and making it a better place for us to live in. For instance, they can diagnose and treat allergic reactions to various environmental elements as well as other environment-related ailments so that we can live harmoniously with the environment.

Some of the simple diagnostic procedures you performed in this program can have a significant social impact on patients and their families. Being able to accurately assess such vital signs as high blood pressure will help people to live longer. And catching sight and hearing loss in its early stages can keep people functioning throughout their lives.

The economic impact of diagnostic care is tremendous. Diagnosing illnesses before they become severe not only saves lives, but also saves money. Usually when an illness is detected early, the cost of treating it is much less. Also diagnostic care which prevent an illness or disability from becoming worse keeps people productive for longer periods of time. This allows them to continue to work and lead productive lives.

DAY 8 ACTIVITIES



ENVIRONMENTAL IMPACT



SOCIAL IMPACT



ECONOMIC IMPACT



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

Currently, the role and responsibility of government in health care is highly debated. Yet no matter the final outcome, diagnostic care is sure to play an important role. Government agencies, such as the Centers for Disease Control and Prevention (CDC), will continue to work on developing new diagnostic procedures and treatment plans.

Diagnosticians can identify specific illnesses and injuries that are the result of ergonomic factors. Repetative motion injuries, such as carpal tunnel syndrome which results in hand pain and numbness, can only be treated if they are properly diagnosed. As the way people use equipment and work tools is further studied, diagnosticians will need to pay close attention to the latest developments in order to provide the best treatment possible to patients under their care.

DAY 8 ACTIVITIES



POLITICAL IMPACT



ERGONOMIC IMPACT



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

Using Career Search Abstracts, find the occupations listed below. Select the two occupations that sound most appealing to you.

On a separate sheet of notebook paper, list the two occupations you selected. For each occupation explain what duties you like, which working conditions you think are most important, and what you believe you'll find most satisfying about the job. Remember to use complete sentences, proper grammar, and correct spelling. Give the sheets to your instructor.

- Medical Assistant
- Optician
- Optometric Assistant
- Physician
- Physician Assistant
- Ultrasound Technologist

DAY 8 ACTIVITIES



CAREER SEARCH ACTIVITY INSTRUCTIONS

RELATED CAREERS

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 8 ACTIVITIES



MEDICAL ASSISTANT



NATURE OF THE OCCUPATION

Medical assistants perform a variety of both routine clinical and clerical duties in a physician's office, clinic, hospital or research laboratory.

Duties may include but are not limited to the following:

- Answering phone, handling mail, greeting patients, filing
- Keeping patient data and medical histories
- Arranging for hospital admission and laboratory services
- Checking and ordering office and medical supplies
- Typing dictation, correspondence and reports
- Filling in Medicare, Medicaid and other insurance forms
- Sending bills and doing book-keeping
- Giving information to patients about preparation necessary for tests, x-rays and laboratory examinations
- Assisting physicians during patient examinations, treatments, minor surgeries and emergencies

OCCUPATIONAL SPECIALTIES

Chiropractor Assistants (079.364-010) aid chiropractors during physical examination of patients, give specified office treatments, and keep patients' records.

Optometric Assistants (079.364-014) perform any number of tasks to assist optometrists, including preparing patients for vision examinations, assisting in testing patients, instructing patients in care and use of glasses and contact lenses, assisting patients in frame selection and adjusting and repairing glasses.

Podiatric Assistants (079.374-018) assist podiatrists in patient care by preparing patients for treatment, sterilizing equipment, preparing dressings, administering treatments and developing x-rays.

WORKING CONDITIONS

Medical assistants usually work in clean, well-lit, and well-ventilated surroundings. The average work week is generally 40 hours and may include evenings and weekends.

Medical assistants working in

small offices generally handle both clerical and clinical duties. In offices with a sizeable staff, medical assistants usually specialize in either office or patient care aspects of the job.

Employers may be doctors, dentists, clinics, hospitals, health maintenance organizations, pharmaceutical companies and medical insurance companies.

Tools, equipment and materials used may include:

- Typewriters
- Adding machines
- Forms, reports, ledgers
- Dictaphones
- Files
- Copy machines

You should like:

- Having contact with others
- Performing a variety of office duties
- A medical setting

You should be able to:

- Take, transcribe and type dictation
- Perform a wide range of clerical duties
- Perform clinical duties
- Work cooperatively and effectively with others
- Follow detailed instructions
- Work quickly and accurately under pressure
- File accurately
- Handle money
- Collect accounts
- Use good judgment when discussing patient care

Physically you must:

- Be able to stand, kneel, stoop and reach
- Do moderate lifting when working with patients
- See well, either naturally or with correction

Special Requirements:

Medical assisting is one of the few health occupations open to

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 8 ACTIVITIES



MEDICAL ASSISTANT

individuals with no formal training. There are also no licensing requirements for medical assistants. Training programs are available at both the secondary and post-secondary levels and are usually preferred. Some states also require that medical assistants pass a test or a short course.

Most employers do prefer to hire certified assistants. The American Association of Medical Assistants awards the Certified Medical Assistant credential and the American Medical Technologists awards the Registered Medical Assistant credential.

Methods for Entry:

One may complete medical assistant training at a school approved by the Committee on Allied Health Education and Accreditation (CAHEA) and the Accrediting Bureau of Health Education Schools (ABHES). Medical assistants with word processing and computer skills will be preferred. To obtain a job, apply directly to physicians, clinics, or hospitals. Help may also be available by consulting newspaper want ads.

EARNINGS AND ADVANCEMENT

Earnings of medical assistants depend on experience and geographic location.

Earnings:

The average starting salary for graduates of medical assistant programs was \$22,227 in 1994. Salaries vary depending upon the years of experience in the medical field. Experienced medical assistants average in the \$26,000 to \$30,000 income range.

Oklahoma Salary:

Region	Range
Central	5.75-9.00
Northeast	7.25-11.00
Northwest	--

Southwest	5.75-10.00
Southeast	6.50-8.00

Fringe Benefits:

Most medical assistants receive paid vacations and holidays and sick pay. They may have insurance through the physician's office. Bonuses may be paid if the doctor is incorporated.

Career ladder for this occupation may look like this:

- Supervisor of Clinic or Office
- LPN or RN
- Office Manager
- Medical Assistant

Advancement may be based on seniority, experience, advanced degrees and ability to supervise.

EMPLOYMENT AND OUTLOOK

Nationally, there were approximately 181,000 medical assistants employed in 1992. Employment is expected to grow much faster than the average for all occupations through the year 2005 because of the growth in the health services industry. Employment growth will be driven by the increased medical needs of an aging population, growth in the number of health practitioners, more diagnostic testing, and the increased volume and complexity of paperwork. Most job openings will result from the need to replace experienced assistants who leave the occupation. Job prospects should be very good for medical assistants with formal training, or experience, particularly those with formal certification.

Oklahoma Employment and Outlook:

In Oklahoma, medical assistants are projected to have 116 job openings annually until the year 2000. Most of these job openings represent new job growth rather than replacements

leaving the occupation, promotions, retirements, etc. In 1990, medical assistants held 2,314 jobs in Oklahoma. They are expected to hold 3,286 jobs by the year 2000. This is considered a fast growth rate.

Levels of education and training usually needed for this occupation:

- On-the-job training
- High school diploma or G.E.D.
- Technical, junior or community college

School subjects helpful in preparing for this occupation:

- English
- First Aid
- Foods and Nutrition
- Math
- Bookkeeping
- Business
- Office Practice
- Shorthand
- Biology
- Chemistry

MORE SOURCES OF INFORMATION

- Accrediting Bureau of Health Education Schools
29089 U.S. 20 West
Elkhart, IN 46514
- Registered Medical Asst's. of Amer. Medical Technologists
Executive Director
710 Higgins Rd.
Park Ridge, IL 60068-5765
- American Association of Medical Assistants
20 North Wacker Drive
Suite 1575
Chicago, IL 60606
- American Medical Association
515 North State Street
Chicago, IL 60610

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 8 ACTIVITIES



OPTICIAN

NATURE OF THE OCCUPATION

Manufacturing opticians make eye glasses by surfacing and edging lenses and assembling them into frames.

Dispensing opticians fit and dispense the eyeglasses made by manufacturing opticians. Some dispensing opticians may also fit and dispense contact lenses.

Duties may include but are not limited to the following:

For dispensing opticians:

- Measuring customers' facial features to determine appropriate style
- Adjusting finished eyeglasses to fit customers
- Keeping records of customers' prescriptions

For manufacturing opticians:

- Selecting proper lens blanks from stock
- Setting-up and operating machines
- Mounting lenses in frames
- Surfacing lenses to proper optical power
- Coloring lenses as specified by work orders

OCCUPATIONAL SPECIALTIES

Optical Mechanics (716.280-014) set up and operate machines to grind eyeglass lenses to prescription specifications and assemble lenses in frames. They also set up and operate machines to fabricate lenses to specifications and inspect mounted lenses for conformance specifications.

Precision Lens Technicians (716.280-018) set up and operate machine tools to fabricate optical elements and systems, applying knowledge of layout and machining techniques and procedures.

WORKING CONDITIONS

Dispensing opticians usually work directly with the public under



minimum supervision of managers or owners of retail optical outlets who, in many cases, must be registered dispensing opticians.

Dispensing opticians work indoors in pleasant, quiet surroundings that are well-lighted and well-ventilated.

They spend part of their time on their feet. They generally work a 40-hour week, although a 45- or 50-hour week is not unusual. Some, especially those employed in retail stores in large shopping malls, work in the evenings and on Saturdays.

Manufacturing opticians work with machines. Sometimes they wear goggles to protect their eyes. Most of their work is done standing in laboratories.

Tools, equipment and materials used may include:

Dispensing opticians:

- Small ophthalmic lab tools
- Soldering units
- Salt or bead pans
- Facial measuring equipment
- Lens gauges

Opticians in laboratories:

- Small ophthalmic lab tools
- Lens drilling devices
- Lens generators
- Lens blockers

- Automatic and hand edging machines
- Lap cutting machines
- Sphere and cylinder surface grinders
- Surface gauges

You should like:

- Activities that involve working with your hands and objects
- Using machines and specific processes
- Activities that are technical in nature
- Working with people, if a dispensing optician

You should be able to:

- Use logical step-by-step procedures
- Perceive detail and differences in shapes and measurements of figures and lines
- Follow directions and work according to exact standards
- Use hand tools and power equipment

Physically you must:

- See and hear well, either naturally or with correction
- Have good perception of depth and color
- Have finger dexterity
- Possess good eye-hand coordination

Special Requirements:

Twenty-two states and Puerto Rico presently require dispensing opticians to be licensed. Requirements vary, but may include completion of a formal training program, passing a state exam and/or proving minimum competency levels.

The American Board of Opticianry has a certification process for dispensing opticians. Eligibility is open to anyone who is a graduate of high school and an accredited school of opticianry, shows

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 8 ACTIVITIES



OPTICIAN

evidence of 5 years' experience as a dispensing optician or shows state licensure by examination. Recertification is required every 3 years through continuing education requirements. A similar program exists for those persons working within the contact lens field.

Methods for Entry:

Methods of entering this occupation include direct application to employers and unions. Positions may also be located by consulting newspaper want ads, school placement offices and state employment offices.

EARNINGS AND ADVANCEMENT

There are great variations in the income levels of opticians. Earnings depend upon the individual's experience, educational background and geographic location.

Earnings:

The earnings of opticians vary considerably; those who work in states that require licensure and those who run their own stores often earn more. First-year opticians averaged about \$33,287 a year in 1994, and their salaries ranged from about \$42,959 to \$64,572 annually.

Fringe Benefits:

Depending on the employer, manufacturing opticians may receive paid vacations and holidays, life, accident, disability and hospitalization insurance, retirement plans and sick pay. These benefits are usually paid, at least in part by the employer.

Career ladder for this occupation may look like this:

- Own Business
- Manager Supervisor
- Dispensing Optician
- Laboratory Optician

• Trainee

Opticians may advance through experience, further training and leadership ability.

EMPLOYMENT AND OUTLOOK

Nationally, there were approximately 63,000 dispensing opticians employed in 1992. Employment for opticians is expected to increase faster than the average for all occupations in response to the growing demand for stylish prescription eyeglasses, contact lenses and increased eye care and health insurance coverage. Employment opportunities should be excellent for dispensing opticians who have an associate degree in opticianry.

Oklahoma Employment and Outlook

In Oklahoma, opticians are projected to have 33 job openings annually until the year 2000. These job openings represent new job growth and replacements caused by leaving the occupation, promotions, retirements, etc. In 1990, opticians held 774 jobs in Oklahoma. They are expected to hold 896 jobs by the year 2000. This is considered an average growth rate.

Levels of education and training usually needed for this occupation:

- On-the-job training
- High school diploma with vocational education
- Technical, junior or community college

Levels of education and training also available for this occupation:

- Apprenticeship

School subjects helpful in preparing for this occupation:

- Algebra

- Geometry
- Trigonometry
- Physics
- Mechanical Drawing

MORE SOURCES OF INFORMATION

- Optical Society of America
2010 Massachusetts Ave.
Washington, DC 20036
- Commission on Opticianry Accreditation (COA)
10111 Martin Luther King Jr. Hwy., Suite 100
Bowie, MD 20720-4299
- National Academy of Opticianry (NAO)
10111 Martin Luther King Jr. Hwy., Suite 112
Bowie, MD 20720-4299
- Opticians Association of America
10341 Democracy Lane
Fairfax, VA 22030

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 8 ACTIVITIES



OPTOMETRIC ASSISTANT

NATURE OF THE OCCUPATION

Optometric assistants perform a combination of tasks to assist the optometrist in visual examinations and corrective procedures.

Duties may include but are not limited to the following:

- Obtaining and recording the patient's preliminary case history
- Maintaining records, schedules, billings and announcements
- Assisting in various visual tests
- Assisting the patient in frame selection
- Adjusting and repairing glasses and modifying contact lenses
- Instructing the patient in the care and use of eyewear

WORKING CONDITIONS

Optometric assistants are supervised by an optometrist. The majority of optometric assistants work 40 hours per week. Some may work less than full time.

Optometric assistants may belong to their state association of optometric technicians and assistants. If they have graduated from an accredited 2-year technician program or passed a voluntary

exam, they are registered with the American Optometric Association. Members must pay dues.

Tools, equipment and materials used may include:

- Lensometers
- Spherometers
- Lens gauges
- Polariscope
- Small ophthalmic laboratory hand tools
- Instruments for verification and modification of contact lenses
- Stereoscopes
- Tachistoscopes and other visual training instruments
- Office machines
- Office computers
- Optical and non-optical aids for use by low-visioned persons

You should like:

- Working closely with people
- Activities of a scientific and technical nature

You should be able to:

- Communicate well with people, both conversationally and re-

garding information that has technical terminology

- Rate information using standards that can be measured or checked

Physically you must:

- Reach, handle, finger and feel
- See well, either naturally or with correction, and have good color vision

Special Requirements:

Optometric assistants may be registered by the American Optometric Association after completing a formal education program (either 1 or 2 years), working for 2 years under the supervision of an optometrist and passing a national registration exam. To maintain registration, 12 hours of continuing education are required annually. A list of approved continuing education programs is available from the American Optometric Association. Registration is not a requirement for employment.

Opportunities for Experience:

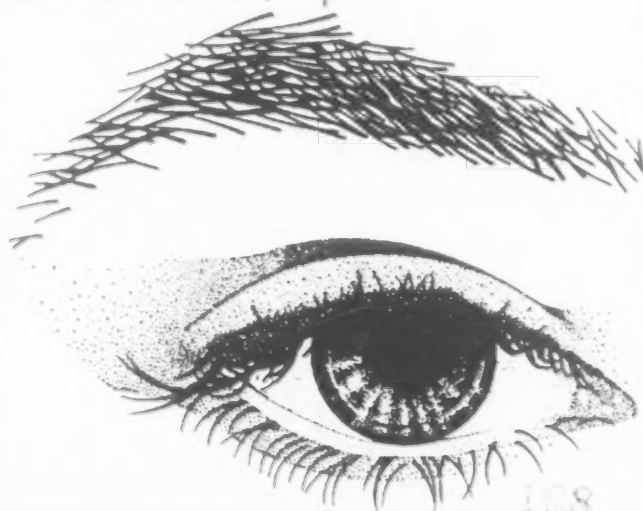
Part-time positions as optometric assistants may be available and will provide experience.

Methods for Entry:

To enter this field apply directly to employers. The national registry for para-optometric personnel of the American Optometric Association provides a free placement service to registered optometric technicians and assistants. Assistance in locating a job may also be available from school placement offices.

EARNINGS AND ADVANCEMENT

Earnings depend upon the size and type of the employing optometrist's practice, the individual assistant's academic and techni-



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 8 ACTIVITIES



OPTOMETRIC ASSISTANT

cal qualifications and geographic location.

Earnings:

Nationally, in 1994, optometric assistants earned salaries ranging from \$16,652 for novices to \$23,812 for highly experienced assistants.

Oklahoma Salary:

Region	Range
Central	6.50-13.00
Northeast	7.25-11.00
Northwest	5.00-9.00
Southwest	5.75-11.00
Southeast	5.75-13.00

Fringe Benefits:

Optometric assistants may receive paid vacations and holidays, life, accident, disability and hospitalization insurance, retirement plans, sick pay and free visual care. These benefits are usually paid, at least in part, by the employer.

Career ladder for this occupation may look like this:

- Optometric Technologist
- Optometric Technician
- Optometric Assistant

EMPLOYMENT AND OUTLOOK

Nationally, there were over 250,000 clinical laboratory technicians, including optometric assistants employed in 1992. Employment of optometric assistants is expected to grow faster than the average for all occupations because of an expected greater demand for eye care services. There should be excellent employment opportunities for those who have completed formal training programs.

Oklahoma Employment and Outlook

No data available.

Levels of education and training usually needed for this occupation:

- On-the-job training
- High school diploma or G.E.D.
- High school diploma with vocational education

Levels of education and training also available for this occupation:

- Technical, junior or community college

School subjects helpful in preparing for this occupation:

- English
- Cooperative Education - Health
- Dental/Medical Assistant
- Clerical
- Office Practice
- Typing
- Science

MORE SOURCES OF INFORMATION

- Public Relations Department
American Optometric Association
243 N. Lindbergh Blvd.
St. Louis, MO 63141

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 8 ACTIVITIES



PHYSICIAN

NATURE OF THE OCCUPATION

Physicians diagnose and treat human diseases and injuries. They practice preventive medicine and perform medical examinations.

Physicians may be doctors of allopathic medicine (MD) or doctors of osteopathic medicine (DO). Most MD's are specialists, because the high-technology medicine that plays such a dominant role in American medical care requires much skill and training. DO's tend to be primary-care providers, such as family practitioners.

Duties may include but are not limited to the following:

- Examining patients
- Ordering or performing various tests, analyses and X-rays
- Prescribing and administering drugs and treatments

OCCUPATIONAL SPECIALTIES

Osteopathic Physicians

(071.101-010) diagnose and treat diseases and injuries of the human body, examine patients to determine symptoms attributable to impairments of the musculoskeletal system. They treat disorders of bones, muscles, nerves and other body systems through surgical procedures or manipulative therapy.

Pediatricians (070.101-066) specialize in the diagnosis and treatment of children's diseases and in preventive medicine for children from birth through adolescence.

Obstetricians and Gynecologists (070.101-054, 070.101-034) specialize in the care and treatment of women during and immediately following pregnancy and in diseases of the female reproductive organs.

Cardiologists (070.101-014) diagnose and treat diseases of the heart.

Psychiatrists (070.107-014) study, diagnose and treat mental, emotional and behavioral disorders.

Podiatrists (079.101-022) diagnose and treat disorders and diseases of the foot and lower leg.

WORKING CONDITIONS

Physicians may work alone, with other physicians or with the nursing staff. They may supervise interns or residents along with the nursing staff. Physicians generally work in well-lighted, well-ventilated hospitals, clinics, nursing homes or offices. They may be exposed to infection from patients and radioactivity from x-rays. Physicians often work long, irregular hours; while one-fourth generally work a 40-hour week, almost half work more than 60 hours a week. Private practice physicians generally maintain regular office hours and an emergency answering service. They must also maintain the business aspect of a practice.

Tools, equipment and materials used may include:

- Medical lab equipment
- Stethoscopes
- X-ray equipment
- Surgical equipment such as scalpels, forceps & and clamps

You should like:

- Activities of a scientific and technical nature
- Helping and working with people
- Working with detail
- Variety, requiring the use of different skills
- Working independently

You should be able to:

- Reason clearly and logically
- Work cooperatively with and direct the activities of others
- Make evaluations and decisions based on judgment and data
- Perceive detail in objects, pictures or graphs
- Communicate effectively in speech and writing
- Remain calm in emergency situations

Physically you must:

- See well, either naturally or with correction, including color vision
- Have full use of hands and fingers
- Possess excellent eye, hand and finger coordination

Special Requirements:

All states, the District of Columbia and Puerto Rico require physi-



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 8 ACTIVITIES



PHYSICIAN

cians to be licensed to practice medicine. Requirements for licensing are graduation from an accredited medical school, internship and passing a state medical exam. Most states grant reciprocity for licensing. The minimum educational requirement for entry to a medical or osteopathic school is 3 years of college, though most have a bachelor's degree. They must also take the Medical College Admissions Test (MCAT) and have letters of recommendation to get into medical school.

Following medical school, almost all M. D. 's go on to 3 years of graduate medical education (residency); those seeking board certification in a specialty may spend up to 5 years in residency.

Most states now require physicians to have 150 hours of continuing education credits every 3 years for license re-registration.

EARNINGS AND ADVANCEMENT

Earnings:

Physicians have among the highest earnings of any occupation. Earnings vary according to specialty, the number of years in practice, geographic region, hours worked, skill, personality and professional reputation.

Average income, after expenses, for all first-year physicians was about \$72,374. With 12 or more years of experience, a physicians income can easily approach \$200,000 yearly. Those who are part owners of their medical practice had an average income of \$197,684, while those who are employed by other practices earned an average of \$138,585 a year.

As shown in the table, average income varies by specialty.

Surgery	\$256,219
Radiology	236,328
Obstetrics/gynecology	218,231
Anesthesiology	208,597
Pathology	173,457

Internal medicine	164,475
Psychiatry	132,141
Pediatrics	147,546
General practice/family practice	107,666

Salaries of medical residents averaged \$29,219 in 1992-93 for those in their first year of residency to \$37,602 for those in their sixth year.

Oklahoma Salary:

Region	Range
Central	over-over
Northeast	over-over
Northwest	30.00-over
Southwest	over-over
Southeast	over-over

Fringe Benefits:

Depending on the employer, physicians may receive paid vacations and holidays, retirement plans, hospital and life insurance, educational leave and sick pay. These benefits are usually paid, at least in part, by the employer. Most physicians, however, are self-employed and must arrange for their own health insurance and retirement programs.

Career ladder for this occupation may look like this:

- Administrator
- Physician
- Intern or Resident

Physicians may advance through experience and professional competence and demonstrated administrative ability.

EMPLOYMENT AND OUTLOOK

There were approximately 556,000 physicians employed nationally in 1992. Employment is expected to grow faster than the average for all occupations through the year 2005 as demand for health care continues to outpace overall economic growth.

Newly trained physicians are likely to experience competition

as they seek to launch a practice. Those who are willing to locate in inner cities, rural areas and other places where doctors are not in oversupply should have little difficulty.

Oklahoma Employment and Outlook:

In Oklahoma, physicians are projected to have 200 job openings annually until the year 2000. These job openings represent new job growth and replacements caused by leaving the occupation, promotions, retirements, etc. In 1990, physicians held 4,758 jobs in Oklahoma. They are expected to hold 5,657 jobs by the year 2000.

Levels of education and training usually needed for this occupation:

- College - bachelor's degree
- Doctor of medicine or doctor of osteopathy degree
- Doctors may specialize in a particular area of medicine, that may require more education and training in this area of specialization

School subjects helpful in preparing for this occupation:

- College Preparatory
- Physical Science
 - English
 - Algebra
 - Statistics
 - Biology
 - Physics
 - Psychology
- Physiology
- Geometry
- Trigonometry
- Chemistry
- Humanities
- Sociology

MORE SOURCES OF INFORMATION

- Attn: Career Information
Amer. Medical Women's Assoc.
801 N. Fairfax St., Suite 400
Alexandria, VA 22314
- Amer. Med. Assn. Div. of Allied Health, Ed. and Accreditation
515 N. State Street
Chicago, IL 60610

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 8 ACTIVITIES



PHYSICIAN ASSISTANT

NATURE OF THE OCCUPATION

Physician assistants provide medical care services to patients under the supervision of a doctor of medicine or osteopathy. They are trained to perform many of the essential but time-consuming tasks involved in patient care, such as taking medical histories, performing medical examinations, ordering laboratory tests, making preliminary diagnoses, prescribing appropriate treatments and recommending medications and drug therapies.

Duties may include but are not limited to the following:

- Taking detailed medical histories and performing physical examinations on patients
- Ordering laboratory tests, x-ray studies, EKG and other diagnostic studies as directed by the physician
- Identifying normal and abnormal findings on histories, performing physical examinations and doing commonly performed laboratory studies
- Suturing wounds, assisting in surgery, applying and removing casts and performing other therapeutic procedures as directed by the supervising physician
- Making hospital rounds to observe and record the progress of patients, updating and summarizing charts and ordering or carrying out indicated therapy

WORKING CONDITIONS

Physician assistants usually work in clean, well-lighted and ventilated physicians' offices, clinics or hospitals. Those who work in surgery often stand for long periods, and others do considerable walking.

Physician assistants usually work a 40-hour week or may work the same hours as the physicians with whom they are employed.



They may be on call 24 hours a day and work as many as 60 to 80 hours a week in order to provide the physician with assistance as needed. Some emergency room PA's work 24-hour shifts twice per week, and others work 12-hour shifts 3 times per week. Their work week may include weekends, night hours or early morning hospital rounds to visit patients.

Physician assistants may belong to the American Academy of Physician Assistants. Members of the association pay fees.

Tools, equipment and materials used may include:

- Stethoscopes
- Electrocardiograph equipment
- Oto-ophthalmoscopes
- Syphgmomanometers (blood pressure)
- Surgical instruments
- X-ray equipment
- Oxygen and other cardio-pulmonary and respiratory equipment
- Intravenous and hypodermic equipment
- Medical laboratory equipment
- Records, reports and manuals

You should like:

- Activities of a scientific and technical nature
- Working with people

You should be able to:

- Rate information using personal judgment
- Rate information using standards that can be measured
- Communicate effectively and patiently with people beyond giving and receiving instructions
- Work within precise limits or standards of accuracy

Physically you must:

- Reach, handle, finger and feel objects
- Lift and carry objects up to 20 pounds
- Talk and hear
- Have good vision, either naturally or with correction

Special Requirements:

To practice as a physician assistant in most states, approval is required by the physician assistant committee of the state licensing and regulation department. To be approved, applicants must pass a proficiency examination after completing an acceptable physician assistant program. The examination is available through the National Commission on Certification of Physician Assistants (NCCPA). In addition, 100 hours of continuing professional medical education is required every 2 years by the NCCPA to maintain accreditation.

Opportunities for Experience:

Usually, there are no opportunities for part-time or summer work in this occupation. Courses in the basic sciences or first aid may help in deciding if one is interested in becoming a physician's assistant. Volunteer work in a

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 8 ACTIVITIES



PHYSICIAN ASSISTANT

hospital or other health facility may also be helpful.

Methods for Entry:

The most common method of entry is completion of a physician assistant program. Assistance in locating a position may be obtained from school placement offices. Graduates who belong to the American Academy of Physician Assistants or state affiliations may use their national employment listing services. For information about positions in government, apply to local, state or federal civil service offices.

EARNINGS AND ADVANCEMENT

A physician assistant's earnings may vary according to the size and geographic location of the employing physician's practice as well as the individual physician assistant's education and experience.

Earnings:

Nationally, in 1994, physician assistants employed in hospitals and medical centers earned a starting salary of approximately \$26,773. The average salary of physician assistants working in all settings was \$35,949 in 1994.

The average salary for experienced PA's working for the federal government was \$43,509 in 1994.

Oklahoma Salary:

Region	Range
Central	10.00-23.00
Northeast	9.00-23.00
Northwest	--
Southwest	--
Southeast	--

Fringe Benefits:

Most physician assistants receive fringe benefits such as paid vacations, holidays, sick leave and insurance and retirement plans. These benefits are usually paid,

at least in part, by the employer. Some may also receive the cost of malpractice insurance or be included on the employer's policy as a rider. Others may receive the cost of required annual continuing professional medical education.

Career ladder for this occupation may look like this:

There is no career ladder for physician assistants. However, they may receive salary increases, which can be considered a form of advancement.

EMPLOYMENT AND OUTLOOK

About 58,000 physician assistants were practicing in 1992. Job opportunities for physician assistants through the year 2005 are expected to reflect faster than average employment growth. Opportunities will be best in rural and inner city areas where there is great difficulty attracting physicians. Physicians and institutions are expected to employ more PA's to provide primary care and assist with medical and surgical procedures. This approach will allow physicians to perform more complicated and revenue generating tasks.

Oklahoma Employment and Outlook:

In Oklahoma, physician's assistants are projected to have 17 job openings annually until the year 2000. These job openings represent new job growth and replacements caused by leaving the occupation, promotions, retirements, etc. In 1990, physician's assistants held 538 jobs in Oklahoma. They are expected to hold 625 jobs by the year 2000. This is considered an average growth rate.

Levels of education and training usually needed for this occupation:

- College - bachelor's degree

School subjects helpful in preparing for this occupation:

- College Preparatory
- Cooperative Education -Health
- Dental/Medical Assistant
- Health Education
- Math
- Biology
- Chemistry
- Psychology

MORE SOURCES OF INFORMATION

- Association of Physician Assistant's Programs
950 N. Washington Street
Alexandria, VA 22314
- Information Center
American Academy of Physician Assistants
950 North Washington Street
Alexandria, VA 22314
- Undergraduate Medical Education
American Medical Association
515 N. State Street
Chicago, IL 60610



ULTRASOUND TECHNOLOGIST

NATURE OF THE OCCUPATION

Ultrasound technologists or sonographers use equipment that transmits sound waves at high frequencies into patients' bodies to form images of the interior of the body. These images are viewed on screens and may be automatically recorded on print-out strips or photographed from the screens to keep in permanent records and use in diagnosis and interpretation by physicians.

Duties may include but are not limited to the following:

- Reviewing the physician's requisition sheet to determine the purpose and type of the examination needed and special considerations involved
- Checking the patient's medical history and prior test results
- Selecting and setting up appropriate equipment for the test
- Planning the procedure and explaining it to the patient
- Assisting the patient in assuming the best physical position to achieve accurate test results
- Completing the final scan while observing the sound wave display screen to make sure the image produced is satisfactory
- Activating equipment that automatically produces a photograph or a printout (called an ultrasonogram) of the ultrasonic pattern

OCCUPATIONAL SPECIALTIES

Many ultrasound technologists, especially those working in large institutions, specialize in examining specific areas of the body. Areas of specialization may include:

- Echoencephalographers** (brain) 078. 364-010
- Echocardiographers** (heart) 078. 364-010
- Ophthalmic Sonographers** (eye) 078. 364-010

Obstetrical/Gynecological Sonographers (pregnant and nonpregnant uterus) 078. 364-010

Doppler Technologists (blood vessels near the surface of the body) 078. 364-010

WORKING CONDITIONS

Ultrasound technologists generally work a 5-day, 40-hour week that may include some evening or weekend hours. Overtime may be required during emergencies. Some hospitals offer flexible work schedules and rotating shifts.

Ultrasound technologists may work alone or with other technologists, nurses, aides and clerical staff in a medical laboratory or a special examination room. They may also perform ultrasonic examinations at the bedsides of critically ill patients. They work under the supervision of a physician and may be supervised by a senior ultrasound technologist. Much of their work day is spent on their feet and they may have to lift or turn patients. Ultrasound technologists may be required to purchase their own uniforms.

Tools, equipment and materials used may include:

- Ultrasonic scanners
- Transducers
- Oil or gel
- Water tanks
- Doppler ultrasonic motion detectors
- Film
- Print coater
- Pillows or pads
- Requisition forms and log books

You should like:

- Activities of a scientific and technical nature
- Activities involving processes, machines and techniques
- Direct personal contact to help others

You should be able to:

- Notice detail in pictures and graphs and see differences in shapes, shadings and measurements of figures and lines
- Look at flat drawings or pictures and imagine how they would look as solid objects with height, width and depth
- Make decisions based on standards that can be measured or checked, using personal judgment
- Deal with people beyond giving and receiving instructions
- Work within precise limits or standards of accuracy
- Use logical step-by-step procedures in your work
- Perform arithmetic operations quickly and accurately

Physically you must:

- Lift and position patients, when necessary
- Reach for, handle and manipulate objects in order to position patients and equipment and to operate controls
- Speak, hear and see well, either naturally or with correction

Special Requirements:

Formal training programs are available in ultrasound technology, ranging in length from 1 to 4 years and leading to a certificate, associate's degree or bachelor's degree. Two year programs are the most prevalent. Candidates for certification must meet specific education and experience requirements and pass an examination given by the American Registry of Diagnostic Medical Sonographers.

Opportunities for Experience:

Because ultrasound technology requires specialized training, opportunities for experience are somewhat limited. Volunteer work in hospitals or work as patient care aides or nurse aides/order-

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

DAY 8 ACTIVITIES



ULTRASOUND TECHNOLOGIST

lies may provide an opportunity to observe the work of ultrasound technologists. Postsecondary programs in electrodiagnostic technology might also provide opportunities for experience.

Methods for Entry:

The primary method of entry into this field is direct application to employers. Assistance in locating job openings may be available through schools that offer ultrasound technology programs and from newspaper want ads.

EARNINGS AND ADVANCEMENT

Earnings of ultrasound technologists vary according to their education, experience, certification, and type, size and location of the employer.

Earnings:

First-year ultrasound technologists earned a national average of \$21,798 in 1994. With up to 7 years' experience, these individuals can expect to earn \$30,020 per year, with the average rising higher \$32,250 in successive years.

Oklahoma Salary:

Region	Range
Central	11.00-15.50
Northeast	10.00-13.00
Northwest	--
Southwest	--
Southeast	11.00-14.00

Fringe Benefits:

Most ultrasound technologists receive paid vacations and holidays, paid sick leave, life, accident, health and disability insurance and pension plans. Those employed by hospitals may also receive dental and optical insurance. These benefits are usually paid, at least in part, by employers.

Career ladder for this occupation may look like this:

- Ultrasound Instructor
- Ultrasound Supervisor
- Ultrasound Technologist

Ultrasound technologists may advance from staff technologist, specializing in one or more techniques, to supervisor, instructor or administrator, depending on their education, skills, experience and certification. Some may enter jobs in industry as technical advisors and sales representatives for ultrasound equipment and supply manufacturers.

EMPLOYMENT AND OUTLOOK

Nationally, there were about 162,000 radiologic technologists employed in 1992. Ultrasound technologists or sonographers hold only a very small proportion of these jobs. Employment is expected to increase much faster than the average for all occupations through the year 2005. Most openings will occur to replace experienced ultrasound technologists who leave the profession.

Oklahoma Employment and Outlook:

No data available.

Levels of education and training usually needed for this occupation:

- On-the-job training
- Technical, junior or community college

School subjects helpful in preparing for this occupation:

- Photography
- English
- Speech
- Health Education
- Algebra
- Geometry
- Biology
- Physics

MORE SOURCES OF INFORMATION

- American Institute of Ultrasound in Medicine
Executive Office
14750 Switzer Lane
Laurel, MD 20707
- Amer. Registry of Diagnostic Medical Sonographers
2368 Victory Parkway
Suite 510
Cincinnati, OH 45206
- Division of Allied Health Education and Accreditation
American Medical Assoc.
515 North State Street
Chicago, IL 60610
- Society of Diagnostic Medical Sonographers
12770 Coit Rd., Suite 508
Dallas, TX 75251

TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

You will need a computer scan sheet or card to record your answers to the following Posttest. Be sure to write your name, the title of the TLA, the date, and the class period on the computer scan sheet or card using a #2 pencil. Use rows 17-32 to record the answers to the Posttest. If your answers will be hand-scored, use a blank sheet of paper to record your answers and number your answers 17-32. Use rows 33-40 on the test card for the spelling test. If the word is spelled correctly, mark (a) on the computer score sheet or card. If the word is spelled incorrectly, mark (b) on the test card. Be sure to use a #2 pencil and make your marks dark. If your answers will be hand scored, use a blank sheet of paper to record your answers and number your answers 17-40.

Get Posttest Questions from your instructor.

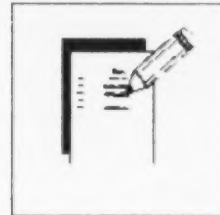
When you finish the Posttest, return the test form and the computer scan card or notebook paper to your instructor.

If you complete Day 8 Activities with time left over, you may complete a Skunk Works activity.

DAY 8 ACTIVITIES



POSTTEST INSTRUCTIONS



TECHNOLOGY EDUCATION DIAGNOSTIC CARE: GRADE 9

The term Skunk Works comes from an engineering division of the 3M Company. In the late 1960s, a group of engineers at 3M wanted to design a new product, but the managers of the company would not give them the money for research. So they decided to design the product anyway, then try to convince the company to market it. Whenever the engineers could grab a few extra minutes from their regular assignments, they worked on the new product. In early 1969 they presented it to the marketing division of 3M, and the company has been selling it every since. The product: Velcro fasteners.

Choose one of the following Skunk Works activities.

1. Complete the suggested activities at the end of previous days which you may not have had time to do. These include:
 - measuring a person's radial and apical pulse before and after exercising
 - putting together a properly balanced meal from the food items listed in Day 4 and/or evaluating the school's lunch menu
 - measure a person's blood pressure while in different positions (standing, seated, laying down)
2. Ask your instructor if you can perform a complete physical assessment on a student. Evaluate this person's radial and apical pulse, vision, hearing, and blood pressure. Be sure to explain to this new patient the purpose of each procedure before you perform it.

SKUNK WORKS



BACKGROUND

SKUNK WORKS CHALLENGE